# NPDES COMPLIANCE MONITORING PROGRAM
## Quality Assurance Program Plan
**(Non-Generic)**

**QA RFA #03341**

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## A2 – Table of Contents



## List of Appendices

## List of Tables



## List of Figures

## List of Definitions

**Aliquot**

Portion of a sample. Often an equally divided portion of a sample.

**Chain-of-Custody**

A record of each person involved in the possession of a sample from the person who collected the sample to the person who analyzed the sample in the laboratory and to the person who witnessed disposal of the sample.

**Code of Federal Regulations (CFR)**

A publication of the United States Government which contains all of the finalized regulations, including environmental regulations.

**Compliance Evaluation Inspection (CEI)**

The CEI is a non-sampling inspection designed to verify permittee compliance with applicable permit self-monitoring requirements, effluent limits, and compliance schedules. This inspection involves record reviews, visual observations, and evaluations of the treatment facilities, laboratories, effluents receiving waters, etc. The CEI also examines both chemical and biological self-monitoring information and provides evidence for enforcement proceedings where appropriate.

**Compliance Sampling Inspection (CSI)**

The CSI is a sampling inspection designed to obtain representative samples required by the permit. Chemical and bacteriological analyses are performed, and the results are used to verify the accuracy of the permittee's self-monitoring program and reports; determine compliance with discharge limitations; determine the quantity and quality of effluents; and develop permits. In addition, the CSI includes the same objectives and tasks as a CEI.

**Discharge (Discharge of a pollutant)**

The addition, introduction, leaking, spilling, or emitting of a pollutant to surface waters from a point source.

**Discharge Monitoring Report (DMR)**

An EPA uniform national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees.

**Document**

Any written, recorded information that is subject to change over time. Procedures, plans, policies, and records are documents. Documents may be controlled.

**Effluent**

Wastewater or other liquid – raw, partially or completely treated – flowing from a basin, treatment process, or treatment plant from a point source to a surface water.

**Effluent Limitations**

Any restriction(s) imposed by the department pursuant to RSA 484-A on quantities, discharge rates, characteristics and concentrations of pollutants which are discharged to surface waters from a point source.

**Environmental Conditions**

The description of a physical medium (e.g., air, water, soil, sediment) or biological system expressed in terms of its physical, chemical, radiological, or biological characteristics.

**Environmental Processes**

Manufactured or natural processes that produce discharges to or that impact the ambient environment.

**Environmental Data Operations**

Work performed to obtain, use, or report information pertaining to environmental processes and conditions.

**Environmental Programs**

A term pertaining to any work or activities involving the environment, including: characterization of environmental processes and conditions: environmental monitoring; environmental research and development; the design, construction, and operation of environmental technologies; laboratory operations on environmental samples.

**Flow-Paced Composite Sample**

A composite sample consisting of a mixture of aliquots (a minimum of eight grab samples) continuously collected proportionally to flow during a 24-hour period.

**Flow-Weighted Composite Sample**

A composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.

**Grab Sample**

A single sample collected at a particular time and place which represents the composition of the wastestream only at that time and place.

**Influent**

Wastewater or other liquid – raw or partially treated – flowing into a reservoir, basin, treatment process, or treatment plant.

**Monthly Operating Report (MOR)**

A State uniform form for the reporting of self-monitoring results by permittees.

**National Pollutant Discharge Elimination System (NPDES) Permit**

NPDES Permit means an authorization, license, or equivalent control document issued by USEPA to implement the requirements of 40 CFR 122.2 and parts 123 and 124.

**NPDES Environmental Inspector**

The role of the Inspector is to gather information that can be used to determine the reliability of the permittee's self-monitoring data and evaluate compliance with NPDES permit conditions, applicable regulations, and other requirements.

**Point Source**

Point source means "point source" as defined in 40 CFR 122.2

**Pollutant**

Pollutant means "pollutant" as defined in 40 CFR 122.2

**Process Wastewater**

Any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

**Program**

A functional unit of the New Hampshire Department of Environmental Services (DES) conducting a defined program. This administrative function will often be found at the Bureau level, but varies across DES. An example would be the Permits and Compliance Program within the Wastewater Engineering Bureau of the Water Division.

**Program Manager**

The person responsible for conducting a specific DES program; this program management function is vested in people at different administrative levels within DES. The term program manager is used to describe staff that have direct knowledge and/or responsibility at the program-specific level.

**Quality Assurance (QA)**

An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by various entities.

**Quality Assurance Program Plan (QAPP), Generic**

A planning document, written to EPA specifications, which describes quality assurance procedures for a program or a set of projects. Use in conjunction with a Sampling and Analysis Plan (SAP – see Definition).

**Quality Assurance Program Plan (QAPP), Non-Generic**

A planning document, written to EPA specifications, which describes quality assurance procedures for a specific Program. A Sampling and Analysis Plan (SAP) is not used in conjunction with a Non-Generic QAPP.

**Quality Control (QC)**

The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

**Quality Management Plan (QMP)**

A formal document or manual, usually prepared once for an organization, that describes the quality system in terms of the organizational structure, functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, and assessing all activities conducted.

**Reconnaissance Inspection (RI)**

The RI is used to obtain a preliminary overview of a permittee's compliance program. The Inspector performs a brief visual inspection of the permittee's treatment facility, effluents, and receiving waters. The RI uses the Inspector's experience and judgment to summarize quickly any potential compliance problems. The objective of the RI is to expand inspection coverage without increasing inspection resources. The RI is the briefest and least resource intensive of all NPDES inspections.

**Records**

A completed document that provides objective evidence of an item or process and is not subject to change over time – unlike a document. Records may include photographs, drawings, magnetic tape, or other data recording media. See documents.

**Relative Percent Difference**

Duplicate precision is typically checked by calculating the relative percent difference (RPD) between the original sample concentration and the duplicate sample concentration.

**Representative Sample**

A sample portion of material or wastestream that is as nearly identical in content and consistency as possible to that in the larger body of material or wastestream being sampled.

**Sampling and Analysis Plan (SAP)**

A planning document used in conjunction with a Generic Program QAPP, which describes the quality assurance procedures for a specific program/task that is not covered by the generic QAPP for the program.

**Split sample**

A sample which is collected and divided in the field into the necessary number of portions (e.g. 2,3, etc.) for analysis.

**Standard Methods**

A joint publication of the American Public Health Association (APHA), American Water Works Association (AWWA), and the Water Pollution Control Federation (WPCF) which outlines accepted laboratory procedures used to analyze the impurities in water and wastewater.

**Standard Operating Procedures (SOPs)**

A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps that is officially approved as the method of performing certain routine or repetitive tasks.

**Surface Waters**

It means the "surface waters of the state" as defined in RSA:485-A:2,XIV and waters of the United States as defined in 40 CFR 122.2.

**Time-Weighted (Sequential) Composite Sample**

A composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

**Upset**

Upset means an exceptional incident in which there is unintentional and temporary non-compliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include non-compliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

## List of Acronyms

| Acronym | Full Phrase |
|---|---|
| APHA | American Public Health Association |
| AWWA | American Water Works Association |
| BOD | Biochemical Oxygen Demand |
| CARP | Compliance Assurance Response Policy |
| CBOD | Carbonaceous Biochemical Oxygen Demand |
| CEI | Compliance Evaluation Inspection |
| *CFR* | *Code of Federal Regulations* |
| COC | Chain-of-Custody |
| CSI | Compliance Sampling Inspection |
| CWA | Clean Water Act |
| DPD | *N,N-Diethyl-p-phenylenediamine* |
| DMR | Discharge Monitoring Report |
| GPH | Gallons per Hour |
| ICV | Independent Calibration Verification |
| IRMU | Information Resources Management Unit |
| LCS | Laboratory Control Sample |
| LFB | Laboratory Fortified Blank |
| LSU | Laboratory Services Unit |
| MGD | Million Gallons per Day |
| MOR | Monthly Operating Report |
| MSGP | Multi-Sector General Permit |
| NHDES | New Hampshire Department of Environmental Services |
| NPDES | National Pollutant Discharge Elimination System |
| PCS | Permit Compliance System |
| POTW | Publicly Owned Treatment Works |
| QA | Quality Assurance |
| QAPP | Quality Assurance Program Plan |
| QC | Quality Control |
| QMP | Quality Management Plan |
| RI | Reconnaissance Inspection |
| RPD | Relative Percent Difference |
| SM | Standard Methods |
| SAP | Sampling and Analysis Plan |
| SOP | Standard Operating Procedure |
| SWPPP | Storm Water Pollution Prevention Plan |
| TRC | Total Residual Chlorine |
| TSS | Total Suspended Solids |
| USEPA | United States Environmental Protection Agency |
| WEF | Water Environment Federation |
| WWEB P&C | Wastewater Engineering Bureau Permit & Compliance |

## A3 – Distribution List

Table 1 presents a list of people who will receive the approved Quality Assurance Program Plan (QAPP), the QAPP revisions, and any amendments.

**Table 1. QAPP Distribution List**

| QAPP Recipient Name | Program Role | Organization | Telephone number and Email address |
|---|---|---|---|
| Sharon Ducharme | NPDES Compliance Coordinator and Program Manager | NHDES Wastewater Engineering Bureau | 603-271-3307 (office)<br>sducharme@des.state.nh.us |
| Thomas Croteau | Program QA Officer and NPDES Environmental Inspector | NHDES Wastewater Engineering Bureau | 603-271-2985 (office)<br>603-419-9497 (cell)<br>603-517-6447 (pager)<br>tcroteau@des.state.nh.us |
| George Berlandi | Program Supervisor | NHDES Wastewater Engineering Bureau | 603-271-2458 (office)<br>gberlandi@des.state.nh.us |
| Rachel Rainey | Laboratory QA Officer | NHDES Laboratory Services | 603-271-8501 (office)<br>rrainey@des.state.nh.us |
| Vincent Perelli | NHDES Quality Assurance Manager | NHDES Planning Unit Commissioner's Office | 603-271-8989 (office)<br>vperelli@des.state.nh.us |
| Roy Gilbreth | NPDES Environmental Inspector | NHDES Wastewater Engineering Bureau | 603-271-1494 (office)<br>603-419-9496 (cell)<br>603-517-6468 (pager)<br>rgilbreth@des.state.nh.us |
| Stephanie Larson | NPDES Environmental Inspector | NHDES Wastewater Engineering Bureau | 603-271-1493 (office)<br>603-419-9498 (cell)<br>603-517-6460 (pager)<br>slarson@des.state.nh.us |
| Mary Jane Meier | NPDES Compliance Engineer | NHDES Wastewater Engineering Bureau | 603-271-5553 (office)<br>mmeier@des.state.nh.us |
| Joy Hilton | EPA Program Officer (NPDES Program) | USEPA Region I | 617-918-1877 (office)<br>hilton.joy@epa.gov |
| Charles Porfert | USEPA Quality Assurance Officer | USEPA Region I | 617-918-8313 (office)<br>porfert.charles@epa.gov |

## A4 – Program/Task Organization

The DES Water Division's Wastewater Engineering Bureau represents the primary entity within DES that deals with the myriad of issues related to effective wastewater management in New Hampshire. Its mission is to ensure that the design, construction, and operation of wastewater treatment facilities are carried out in accordance with all applicable federal laws, state statutes, local by-laws and ordinances, and to assure the appropriate removal, transportation, and disposal (or beneficial use) of associated residuals. Specifically, one of its role is to ensure that wastewater treatment facilities are operated in accordance with the facilities' discharge permits (and effluent limits) by providing NPDES compliance inspections, technical assistance, and operator training and certification[1].

NHDES Wastewater Engineering Bureau's Permits and Compliance Section (WWEB P&C) staff inspects these facilities that have received NPDES/State permits and reviews monthly discharge monitoring reports to ensure that these permitted facilities are in compliance with all applicable federal and state permit conditions. The WWEB P&C will implement this monitoring program with sampling conducted by the NHDES NPDES Environmental Inspectors (Inspector) and laboratory analysis performed by the NHDES Laboratory Services Unit (LSU).

NHDES Wastewater Engineering Bureau

Sharon Ducharme, Compliance Coordinator, is the Program Manager, under the supervision of George Berlandi, Supervisor of WWEB P&C. The Program Manager will be responsible for the overall Program implementation and final report preparation, preparation and maintenance of the approved QAPP, and will be the primary contact between NHDES and EPA. Each fiscal year, the Program Manager, with concurrence by the USEPA, select a number of NPDES permittees that will be inspected and/or sampled by the Inspectors in the Compliance Section.

Thomas Croteau, Inspector for the Compliance Section, will also act as the Program Quality Assurance (QA) Officer. As a result of this dual role, the work of the Program Quality Assurance Officer will be strictly reviewed by the Program Manager.

Each Inspector is responsible for deciding, unless otherwise directed by the Program Manager, when to inspect the selected list of NPDES permit holders including coordinating field sampling activities and sample delivery to the NHDES LSU. The Program Manager will be able to contact the Inspectors by either pager or cellular phone if unanticipated changes are needed in the Program schedule.

If problems or questions arise during an inspection or sampling protocol, each of the Inspectors will be able to communicate with the Program Manager via cellular phones.

NHDES Laboratory Services Unit

Rachel Rainey is the Program Manager and QA Officer for the NH Department of Environmental Services Laboratory Services Unit (LSU). She is responsible for performing QA reviews on the laboratory data and communicating any analytical problems to the Program Manager and/or Inspector.

The data collected by this Program will be used by WWEB P&C to assess compliance with the individual NPDES permit and to complete EPA's NPDES 3560-3 Form. This data will be made available to the public upon request.

[1] Excerpt from the *NHDES Guidebook for Environmental Permits in New Hampshire* 2002 Edition

Figure 1 shows the Program's personnel flow chart and Table 2 provides a description of roles and responsibilities as they relate to this Program.

**Figure 1.**

**Program's Organizational Chart**

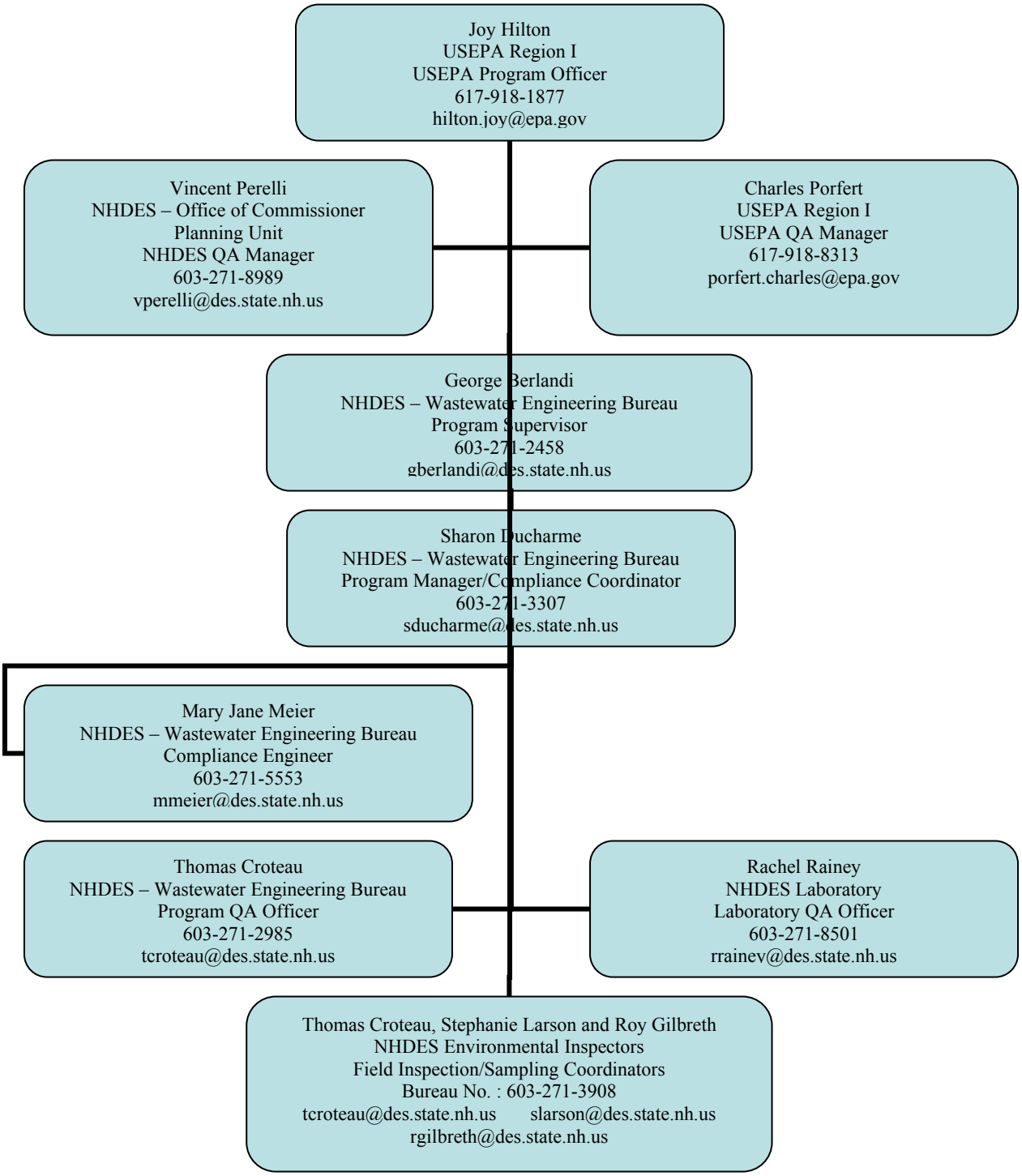

**Table 2. Personnel Responsibilities and Qualifications**

| Name and Affiliation | Responsibilities | Qualifications |
|---|---|---|
| George Berlandi<br>NHDES Wastewater<br>Engineering Bureau | Oversees WWEB P&C activities | On file at NHDES |
| Sharon Ducharme<br>NHDES Wastewater<br>Engineering Bureau | Oversees compliance inspection and enforcement activities.<br>Responsible for review of the Program QA Officer's work. | On file at NHDES |
| Mary Jane Meier<br>NHDES Wastewater<br>Engineering Bureau | Assists with enforcement activities | On file at NHDES |
| Thomas Croteau<br>NHDES Wastewater<br>Engineering Bureau | Prepares, reviews and modifies QAPP and related QA/QC activities | On file at NHDES |
| Stephanie Larson<br>Thomas Croteau<br>Roy Gilbreth<br>NHDES Wastewater<br>Engineering Bureau | Responsible for field inspection/sampling activities | On file at NHDES |
| Rachel Rainey<br>NHDES Laboratory Services Unit | Oversees laboratory QA/QC activities and identifies necessary corrective actions | On file at NHDES |
| Vincent Perelli<br>NHDES Quality Assurance Manager | Oversees NHDES QA System and responsible for review of the draft QAPP | On file at NHDES |
| Joy Hilton<br>USEPA Region I<br>Water Technical Unit | Oversees NHDES NPDES inspection and enforcement activities | On file at EPA |
| Charles Porfert<br>USEPA Region I<br>Quality Assurance Unit | Responsible for review and approval of the draft QAPP | On file at EPA |

## A5 – Problem Definition/Background

As New Hampshire is a non-delegated state, EPA administers the National Pollutant Discharge System ("NPDES") Program. Accordingly, EPA issues the federal NPDES permit under Section 402 of the federal Clean Water Act. However, EPA cannot issue the federal permit until the state certifies, in writing, that the permit complies with all applicable state rules and regulations. The Permits and Compliance Section of the DES Wastewater Engineering Bureau is responsible for providing the state certification. After the federal NPDES permit is issued, DES adopts this permit as a state permit, as required under RSA 485-A:13 ("Water Pollution and Waste Disposal/Water Discharge Permits").

Even though we are a non-delegated state, compliance with the NPDES Program is monitored by the Permits and Compliance Section. Sections 308 and 402 of the Clean Water Act provide for the transfer of Federal program authority to States to conduct NPDES permit compliance monitoring. As mentioned in Section A4, point source dischargers of pollutants (e.g., municipal wastewater treatment plants and industries) are issued permits that set specific limits and operating conditions to be met by the permittee. Section 308 authorizes inspections and monitoring to determine whether NPDES permit conditions are being met. This section provides for two types of monitoring:

1. Self-monitoring, where the facility must monitor itself
2. Monitoring by the permit-issuing agency (EPA or State), a process that may include the agency's evaluating the self-monitoring and/or conducting its own monitoring

Under *40 Code of Federal Regulations (CFR)* 123.26 (relating to State programs), three objectives are to be met during a routine compliance inspection. The inspection/sampling is performed in a manner designed to:

1. Determine the compliance status with permit conditions and other program requirements such as, but not limited to: the quality of the treated discharge to the receiving water for foam, color or loss of treatment plant solids; the adequacy and regular updates of the QA/QC manual and Emergency Response Plans; and the overall operations and maintenance of the facility;
2. Verify the accuracy of information submitted by the permittee; and
3. Verify the adequacy of sampling and monitoring conducted by the permittee.

Other purposes of compliance inspection/sampling include:

1. Gathering evidence to support enforcement actions;
2. Obtaining information that supports the permitting process; and
3. Assessing compliance with orders or consent decrees.

## A6 – Program/Task Description

The Inspector is a representative of EPA and is often the initial contact between EPA and the permittees. In dealing with facility representatives and employees, Inspectors must be professional, tactful, courteous and diplomatic. The primary role of the Inspector is to gather information that can be used to determine the reliability of the permittee's NPDES self-monitoring data and evaluate compliance

with permit conditions, applicable regulations, and other requirements. Appendix A, A-1 and A-2 contain a copy of an NPDES Inspection Checklist, NPDES Inspection Worksheets w/Attachment and EPA's NPDES Compliance Inspection Report, the 3560-3 form, respectively. The objective of an NPDES Inspection Checklist is to be consistent in organizing and coordinating all inspection information and evidence into a comprehensive, usable document. The checklist serves as the Sampling and Analysis Plan (SAP) for this program-specific QAPP. In addition, the checklist may be modified to address any new rules and regulations promulgated by state or federal agencies. To meet the objective of the checklist, the information collected is presented in a clear, consistent, and well-organized manner. The information shall be objective and factual (based on sound inspection practices). Once the information collected by the Inspector is reviewed, organized, and referenced, the NPDES Inspection Worksheet(s) can be written up. The purpose of the NPDES Inspection Worksheet(s) is to report to the permittee the facts relating to potential violations and deficiencies found during a routine inspection. The Inspector is also responsible for reporting all compliance activities by completing EPA's NPDES Compliance Inspection Report Form and forward in a timely manner (generally within 30 days of the inspection date) the original form to the EPA Program Manager and copies to the permittee and Program Manager.

The Inspector also plays an important role in enforcement case development and support, and in NPDES permit development.

Inspectors shall observe procedures shown in Table 3 for conducting each inspection element. Depending on the specific purpose of the inspection, the emphasis given to each element may vary among different facilities.

With reference to a work schedule, the inspections are conducted each fiscal year starting on July 1$^{st}$ and ending on June 30$^{th}$. Prior to the beginning of a new fiscal year, the QAPP Program Manager and the EPA Program Manager meet to discuss which permitted facilities will be annually inspected and/or sampled. Thereafter, the list of targeted facilities is then divided and assigned to each of the Inspectors.

Most inspections at NPDES permitted facilities are either compliance evaluation inspections (CEIs – non-sampling) or compliance sampling inspections (CSIs - sampling). During a CSI, grab effluent samples are collected for pH, temperature (if applicable), dissolved oxygen (if applicable), turbidity (if applicable), and/or total residual chlorine (applicable to all except for facilities utilizing ultra-violet disinfection) and are analyzed in the field. In addition, representative effluent samples are also collected for BOD or CBOD, TSS, *e. Coli*, metals (if applicable) and nutrients (if applicable) and are analyzed by the NHDES LSU for chemical and bacteriological analyses. The Inspector may conduct a split sample with the permittee as a means to evaluate the permittee's laboratory analytical techniques and procedures. Comparison of the split sample data will be used in identifying discrepancies between laboratories in analytical methodologies. Any widely divergent results from split sampling will be investigated and the cause identified.

The Inspectors and Program Manager use the analytical data to verify the accuracy of the permittee's NPDES self-monitoring program and reports; determine compliance with discharge limitations; determine the quantity and quality of the effluent; and provide evidence for enforcement proceedings, where appropriate. The WWEB P&C's permit writers will also use this information in assisting EPA in the development and reissuance of NPDES permits.

The analytical results, as well as the information compiled on the NPDES Inspection ckecklist, are filed at the NHDES Wastewater Engineering Bureau's Permits and Compliance Section.

**Table 3. Inspector's Responsibilities**

**Pre-Inspection Preparation. Ensure effective use of inspection resources.**
1. Notify facility, if applicable. Generally, the facility is not notified.
2. Establish purpose and scope.
3. Review background information from records, including permit and permittee compliance files.
4. Contact other state program personnel for further information on the permittee (e.g., Hazardous Waste Bureau and Air Resources Division).
5. Develop inspection plan.
6. Prepare documents and equipment, including appropriate safety and sampling equipment.
7. Coordinate schedule with laboratory if sample collection is anticipated.
8. Coordinate schedule, if requested, with other appropriate regulatory authorities (e.g. USEPA or other state program personnel for multi-media type inspections).

**Entry. Establish legal entry to facility.**
1. Present official credentials.
2. Manage denial of entry if necessary.

**Opening Conference. Orient facility officials to inspection plan.**
1. Discuss inspection objectives and scope.
2. Establish working relationship with facility officials.

**Facility Inspection. Determine compliance with permit conditions; collect evidence of violations.**
1. Conduct visual inspection of facility.
2. Review facility records.
3. Inspect monitoring location, equipment, and operations.
4. Collect samples, if appropriate.
5. Review laboratory records for QA/QC.
6. Review laboratory procedures to verify use of approved methods.
7. Document inspection activities by completing the NPDES Inspection Checklist and where appropriate, complete attachments A, B, C, and D (Appendix A).

**Closing Conference. Conclude inspection.**
1. Collect missing or additional information.
2. Clarify questions with facility officials.
3. Review inspection findings and inform officials that an inspection report will be submitted.

**Post Inspection. Organize inspection findings in a report so as to be useful in the development and support of evidence for potential enforcement action.**
1. Review NPDES Inspection Checklist with attachments (Appendix A) and, if appropriate, discuss any issues or items of concern with the Program Manager.
2. Complete an NPDES Inspection Worksheet (Appendix A-1) identifying deficiencies documented during the inspection and forward the worksheets to the permittee for its corrective action plan.
3. Complete EPA's NPDES Compliance Inspection Report Form 3560-3 (Appendix A-2) and submit to USEPA Region I including a copy of the permittee's response on the NPDES Inspection Worksheet(s).

## A7 – Quality Objectives and Criteria

Whether the Inspector is evaluating a permittee's sampling program or conducting compliance sampling on the permittee's effluent, that Inspector must be familiar with the procedures and techniques necessary for accurate wastewater sampling. Sample collection is an important part of the compliance monitoring program. Without proper sample collection procedures (Appendix C-1), the results of such monitoring programs are neither useful nor valid, even with the most precise and accurate analytical measurements.

The environmental measurements (parameters) taken during a compliance monitoring program are dependent upon the monitoring requirements specified in each NPDES permit. Table 4 summarizes the performance criteria for samples collected for this program.

**Table 4. Measurement Performance Criteria for Wastewater Samples**

| Data Quality Indicators | Measurement Performance Criteria | QC Sample and/or Activity Used to Assess Measurement Performance |
|---|---|---|
| Precision-Field | See Table 21 | Field Duplicates |
| Precision-Lab | See Section B5 – Quality Control | Lab Duplicates |
| Accuracy/Bias | See Section B5 – Quality Control | Spikes/Duplicates |
| Representativeness | Determine compliance with discharge limitations and the quantity and quality of effluents | Obtain representative effluent samples as required by the permit |
| Comparability | Deviation from SOPs should not influence the data by more than 5% | Data Comparability Check |
| Sensitivity | See Table 5 | Laboratory-fortified blanks |
| Data Completeness | 100% samples collected | Data Completeness Check |
| Field Contamination | </= Reporting Detection Limit (see Table 5) | Field Blank |
| Lab Contamination | </= Reporting Detection Limit (see Table 5) | Lab Blanks |

Precision: Duplicate precision is typically analyzed by calculating the relative percent difference (RPD) using the equation:

$$RPD = \frac{|x_1 - x_2|}{\left(\frac{x_1 + x_2}{2}\right)} \times 100\%$$

where $x_1$ is the original sample concentration
$x_2$ is the duplicate sample concentration

RPDs < 15% will be deemed acceptable for field duplicates and <10% for lab duplicates.

Accuracy: As an indicator of measurement confidence, percent accuracy will be calculated based on NHDES LSU's analytical results of spiked samples of known chemical concentrations:

$$\%Accuracy / Bias = \frac{SpikedSampleConc. - UnspikedSampleConc.}{SpikedConc.Added} \times 100\%$$

For pH, accuracy is expressed as the difference between the mean measured value and the theoretical value.

No accuracy objectives have been set for the total/fecal coliforms or *E. coli* analyses because there is no practical way to perform spiked samples or analyze standard reference materials for coliforms. In lieu of this, the NHDES LSU can run positive and negative control samples to determine that the analytical procedure is performing properly.

Representative: The objective of this Program is to take qualitative measurements that will be representative of the wastewater from treatment plants or industry and its impact on the receiving stream.

Comparability: Using standardized sampling and analytical methods, units of reporting, and specific site selection procedures help ensure comparability. Whenever possible and practicable, the field and laboratory methods for this Program are identical to those used by the permit holder. The laboratory analyses are based on procedures from the current and subsequent EPA-approved edition[2] of *Standard Methods for the Examination of Water and Wastewater* and/or 40 CFR 136.

Sensitivity. Background information on each proposed sampling location exists, and the data show that the methods and instruments are able to detect the parameter(s) of concern. Detectable ranges of the methods and the equipment (as shown in methods and SOPs) are adequate for the purpose of this NPDES program.

Data Completeness: This Program is not a special study where loss of data would result in a poorly executed study, or as in this instance, Program. Since this is neither a study or short-term project, the lack of completeness is not a vital concern in this Program where any incomplete sampling of one or more of the permitted facilities would not compromise the validity of the sampling data obtained from facilities that were sampled for compliance. This Program proposes to randomly select and monitor yearly a large portion of the NPDES permit holders for compliance with their permit. Therefore, the number of planned sample events has no bearing on any proposed study or Program assessment. The information collected is to simply verify compliance with state and federal permit requirements.

Quantitation Limits. The analytical method, analytical/achievable method detection limit, and the analytical/achievable laboratory quantitation limits for this Program are shown in Table 5.

[2] Prepared and published jointly by American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF).

## Table 5. Wastewater Target Analytes and Reference Limits

| Analyte | Analytical method[3] | Program Action Level | Analytical/Achievable Method Detection Limit | Reporting Detection Limit (Achievable Lab Quantitation Limit) |
|---|---|---|---|---|
| Total Suspended Solids (TSS) | EPA Method 160.2; Standard Method 2540D | Varies by Permit | 1.0 mg/L | 1.0 mg/L |
| Biochemical Oxygen Demand ($BOD_5$) | EPA Method 405.1; Standard Methods 5210B | Varies by Permit | 2.0 mg/l | 2.0 mg/L |
| Chlorine, Total Residual (TRC) | EPA Method 330.5; Standard Method 4500 –Cl G; field measured | Varies by Permit | 0.01 mg/L | 0.1 mg/L |
| pH | EPA Method 150.1; Standard Method 4500-H+ B; field measured | 6.5-8.0 | 0.01 SU | 0.1 SU |
| Fecal coliform in absence of chlorine | Membrane Filter (MF), single step, EPA 600/4-85/076; Standard Method 9222D.4 | 14 cts/100 mL | 0+ cts/100 mL (depends on dilution and sample volume) | 0+ cts/100 mL (depends on dilution and sample volume) |
| Fecal coliform in presence of chlorine | Membrane Filter (MF), single step, EPA 600/4-85/076; Standard Method 9222D | 14 cts/100 mL | 0+ cts/100 mL (depends on dilution and sample volume) | 0+ cts/100 mL (depends on dilution and sample volume) |
| Total coliform in absence of chlorine | Membrane Filter (MF), single step or two step, EPA 600/4-85/076; Standard Method 9222B | 70 cts/100mL | 0+ cts/100 mL (depends on dilution and sample volume) | 0+ cts/100 mL (depends on dilution and sample volume) |
| Total coliform in presence of chlorine | Membrane Filter (MF), with enrichment, EPA 600/4-85/076; Standard Method 9222(B+B.5c) | 70 cts/100mL | 0+ cts/100 mL (depends on dilution and sample volume) | 0+ cts/100 mL (depends on dilution and sample volume) |
| *E. coli* | Membrane Filter Procedure, EPA 600/4-85/076; Standard Method 9213D.3 | 126 cts/100 mL | 0+ cts/100 mL (depends on dilution and sample volume) | 0+ cts/100 mL (depends on dilution and sample volume) |
| Turbidity | EPA Method 180.1; Standard Method 2130B; field measured | >10 NTUs above natural occurring conditions | 0.01 NTU | 0.1 NTU |
| Dissolved Oxygen | EPA Method 360.1; Standard Method 4500-O G; field measured | < 5 mg/l | NA | NA |
| Temperature | EPA Method 170.1; Standard Method 2550 B; field measured | State Water Quality Standard | NA | NA |
| Metals | | | | |
| Copper | EPA Method 200.7 or 200.8[4] | Report only | 0.1 µg/L | 5.0 µg/L |
| Lead | EPA Method 200.7 or 200.8 | Report only | 0.07 µg/L | 1.0 µg/L |
| Silver | EPA Method 200.7 or 200.8 | Report only | 0.143 µg/L | 5.0 µg/L |
| Zinc | EPA Method 200.7 or 200.8 | Report only | 0.245 µg/L | 5.0 µg/L |

[3] Most current approved procedures prescribed in 40 CFR – Chapter I – Part 136
[4] EPA-New England's "Interim Alternate Test Procedure (ATP) approved under 40 CFR – Chapter I – Part 136.5 for NPDES Compliance Samples dated May 19,2003"

| Analyte | Analytical method[3] | Program Action Level | Analytical/Achievable Method Detection Limit | Reporting Detection Limit (Achievable Lab Quantitation Limit) |
|---|---|---|---|---|
| Nutrients | | | | |
| Ammonia Nitrogen as N | EPA Method 350.1/.2; Standard Method 4500-NH | Varies by Permit | 0.078 mg/L | 0.5 mg/L |
| Total Phosphorus as P | EPA Method 365.2; Standard Method 4500-P E | Varies by Permit | 0.0022 mg/L | 0.005 mg/L |

NA = Not Applicable

## A8 – Special Training/Certification

The Program recognizes that the quality of environmental data that it collects and manages is dependent upon the qualifications and proficiency levels of the NHDES Laboratory Services Unit and WWEB P&C's personnel who handle the data. Personnel qualifications are set under the Division of Personnel, which address both general job classification descriptions, and job-specific qualifications specified under supplemental job descriptions. The class specifications are established by the Division of Personnel, and the supplemental job descriptions come out of a corroborative effort between WWEB P&C, the NHDES Human Resources Unit and the Division of Personnel, ensuring the WWEB P&C's input in establishing the personnel qualifications for each of its positions. The WWEB P&C provides in-house training, and promotes staff participation in other required training, including local workshops, regional training, and EPA courses.

As described earlier in this plan, all personnel undergo various types of training including: new employee orientation (which might include "apprenticeship" periods where, for example, a new Inspector travels with a more experienced Inspector), on-the-job training, training conducted by the Division of Personnel's Bureau of Education and Training, participation in regional technical training programs involving USEPA Region I and other states in the region, and national training programs involving USEPA Region I, other federal agencies, Non-Profit Organizations and Non-Governmental Organizations. Currently, there is no set training schedule, but rather training is conducted as deemed necessary, or as made available to the WWEB P&C (e.g. EPA training session on the revised multi-sector general permit requirements for storm water management).

The Program Manager and WWEB P&C staff are encouraged to draw upon their educational background, experience, professional training, conferences, and on-the-job training to enhance their understanding and performance of quality assurance-related procedures. Records shall be kept of all quality assurance training attended.

The Program Manager may arrange or alert staff to courses that are available to satisfy staff quality training needs. The WWEB P&C personnel training is tracked by recording the attended training programs in the employee's personnel file maintained by NHDES's Human Resources Unit (HRU). The Program Manager encourages the staff to forward their training records to DES's HRU in a timely manner so that each employee's training file is kept up-to-date. In addition, a tabulated training log will be separately maintained by the Program QA Officer and filed with the WWEB P&C.

## A9 – Documents and Records

Providing strong documentary support of deficiencies discovered in an inspection is an Inspector's basic responsibility. Documentation is a general term referring to all printed information and mechanical media produced, copied, or taken by an Inspector to provide evidence of alleged deficiencies and/or violations. Types of documentation include: field notebooks, statements, photographs, drawings, maps, printed matter, mechanical recordings, analytical sampling results and copies of records. Chapter 6 of the NHDES QMP provides an overview on documents and records retention and control.

The primary inspection document is the NPDES Inspection Checklist (Appendix A), which provides accurate and inclusive documentation of all routine inspection activities. This checklist allows the Inspector to be consistent with each inspection undertaken. All entries are made in permanent ink. The checklist forms the basis for written reports and contains only facts and pertinent observations.

The date and time of arrivals and departures are noted on each inspection checklist. Any errors in the checklist are crossed out and initialed by the Inspector.

NPDES Inspection Checklist (Appendix A) and NPDES Inspection Worksheet (Appendix A-1): Each Inspector utilizes this checklist during a typical facility inspection. The checklist also contains Attachments A – D which are sub-checklists used for specific areas of the inspection. As stated earlier, the information gathered is assessed to determine the facility's compliance status. If the Inspector observes either deficiencies or violations, the Inspector will provide a written report called 'NPDES Inspection Worksheet' (Appendix A-1) in which the facility is put on record for noncompliance with its NPDES Permit conditions and/or requirements. The facility is then given 30 days to respond and describe all steps taken or proposed to correct the identified deficiencies. If the facility fails to respond within 30 days, appropriate enforcement actions will be undertaken.

Photographs: When a situation dictates the use of photographs, the Inspector should document the photographs (refer to Section 8.7 of the NHDES QMP for further details) in a field notebook or directly onto the inspection checklist. The Inspector should obtain the facility's approval prior to photographing proprietary items. In some cases, the Inspector may explain to the permittee's representative that wastestreams, receiving waters, and wastewater treatment facilities are public information, not trade secrets. In the event the facility refuses to allow photographs and the Inspector believes the photographs will have a substantial impact on future enforcement proceedings, the NHDES Legal Unit should be consulted for further instructions. Hand-drawn pictures, detailed written descriptions, and field measurements may suffice in lieu of photographs. This information should be collected in addition to photographs. At all times, the Inspector is to avoid confrontations.

NHDES LSU's Login/Chain-of-Custody Sheet (Appendix B): Sample collection field data at outfall pipes and tributaries will be recorded directly into a field notebook. Field data for the wastewater samples will be transferred from the field notebook to the LSU's Chain-of-Custody sheet for each sample collected. Upon arrival at the LSU, the Inspector will complete the Chain-of-Custody sheet accompanying the field samples. The LSU's standard turnaround time for sample analysis is satisfactory. However, if the Inspector requires that the sample analysis be expedited as a result of either an enforcement case or a potential violation, the Inspector would write in "RUSH" in the comment section of the Chain-of-Custody sheet. The Inspector will make a photocopy of the Chain-of-Custody and retain it while the sample is being analyzed. The Chain-of-Custody photocopy is on file for that specific facility within the WWEB P&C filing system.

Laboratory Data Reports: Data packages from the laboratory will be hardcopy laboratory data sheets containing analytical results for each field sample. The laboratory reports are filed in the WWEB P&C filing system. All NHDES LSU records are safely stored in secured locations in the laboratory and in other places in the building (Room 14). Client confidentiality is protected in storage to the extent that the lab is locked at night and in a secured wing. Raw data and sample numbers are stored in the Laboratory Information Management Systems (LIMS) located in Room 14. Key access to Room 14 is limited to lab wing staff and maintenance. The IRMU ensures that the LIMS functions properly, backups are performed, and provides technical assistance for both hardware and software problem resolution. All backup tapes are stored in the Vital Records safe in the IRMU.

Final Report to EPA – Form 3560-3 (Appendix A-2): Within 5 days following the inspection, the Inspector will complete and submit EPA's 3560-3 Form to the USEPA NPDES Program Manager along with copies of the NPDES Inspection Worksheets w/Attachments (facility's responses are included on these worksheets) and/or laboratory data report. Upon receipt of this information, the USEPA NPDES Program Manager logs the information in the Permit Compliance System (PCS) database and hardcopies are maintained in files.

Archiving: The original field and laboratory data sheets, QAPP, and any other reports will be kept on file by the WWEB P&C. The process of reviewing, approving, retaining and archiving documents and records varies according to the type of document or record (see Table 6). A document, such as this plan, will be internally reviewed by the Program Supervisor, Program Manager, Inspectors, WWEB P&C QA Manager and NHDES QA Manager prior to being submitted for final approval to the USEPA NPDES Program and USEPA QA Managers. The most current approved version of the QAPP for the NPDES Compliance Monitoring Program will be electronically stored in the NHDES's database. A hard-copy will be retained in the NHDES WWEB P&C files. Any changes to the QAPP will be submitted to EPA for approval by the Program QA Officer. Any deviations from and stipulations not addressed in this QAPP, a sampling and analysis plan (SAP) will be prepared and incorporated into the parent QAPP. An example of a SAP can be found in Appendix F. All current and revised versions of the QAPP and/or SAPs will be distributed to appropriate parties by the Program QA Officer. The QAPP will be maintained indefinitely after the date of the final approval, updated yearly as needed, and fully reviewed, updated and re-submitted to NHDES QA Manager and USEPA every 5 years.

Retention and archiving of records is done in accordance with specific statutory or regulatory requirements (additional guidance is provided in Chapter 6 of the NHDES QMP). It is preferable for data to be recorded in both paper and electronic form, although this may not be possible in all cases. Electronic data is converted and/or updated to newer versions or technologies at least three to four years so that data is always in a readily retrievable format that has kept pace with ongoing information technology software and hardware advances.

It should be noted that handling of documents used to support enforcement cases are subject to separate requirements. See Section E of Chapter I of the DES *Compliance AssuranceResponse Policy (http://www.des.state.nh.us/legal/carp/carp-ch-1.pdf)*. A specific *WWEB P&C Records Retention Schedule* was developed to show how long a record will be retained in the WWEB P&C's office and subsequently how long the record will remain in archives (storage). Some records are classified as permanent (e.g., outfall locations because they are tied to a permanent map showing the discharge points throughout the state and enforcement documents).

Records are kept for a minimum of 5 years. The records retention schedule for this Program is shown in Table 6.

**Table 6. Proposed Records Retention Schedule**

| Item/Material | Recommendation | Final Disposition | Comments |
|---|---|---|---|
| NPDES Permit Related:<br>NPDES Permits<br>Discharge Monitoring Reports<br>Inspection Reports<br>Correspondence<br>Laboratory Reports | <br>Hard Copy Only<br>Hard Copy Only<br>Hard Copy Only<br>Hard and Electronic Copies<br>Hard and Electronic Copies | <br>Destroy after 5 years<br>“<br>“<br>“<br>“ | 5 years after no action relative to the facility or purge according to final disposition, whichever comes first |
| Outfall Location Maps (GIS) | Permanent/Computerized data system | Retain indefinitely | Hard-copy or write-protected back-up copy |
| Enforcement documents and supporting data | Hard-copy | Retain indefinitely | Hard-copy or write-protected back-up copy |
| General Correspondence/Memos | Hard-copy | Destroy after 5 years | Purge letters over 5 years old |
| EPA/State Correspondence | Hard-copy | Destroy after 5 years | Purge letters over 5 years old |
| Employee Training Records | Made part of personnel’s permanent record | Destroy upon retirement | Official state records kept in Concord |
| Databases | Computerized data system on the NHDES server which is maintained by IRMU | Maintain minimum of 5 years worth of data | Purge data over 5 years old to minimize space in the computer system |
| QAPP | Hard and/or electronic-copy | Retain indefinitely | Reviewed, updated and submitted every 5 years to DES QA Manager & USEPA |

## B1 – Sampling Process Design

Wastewater sampling/analysis is an integral part of the NPDES Compliance Monitoring Program. NPDES permits contain specific and legally-enforceable effluent limitations and monitoring requirements. As stated earlier in Section A6-Program/Task Description, the Program's purpose is to verify compliance with a facility's NPDES permit and assess the wastewater quality entering the surface waters of the State. Therefore, there is one component to the sampling design for this Program: randomly selecting wastewater plants and industries for NPDES compliance sampling from approximately 155 permitted facilities around the state.

### Sampling Locations

Samples are collected at the sampling location identified and specified in the permit. In some instances, the sampling location specified in the permit or the location chosen by the permittee may not be adequate for the collection of a representative sample. In this instance, the Inspector should determine the most representative sampling point available and collect a sample at both locations. Any conflicts in the sampling criteria must be documented and later resolved with the permitting authority (USEPA Region I). The Standard Operating Procedure (SOP) for sampling procedures and techniques can be found in Appendix C titled "C-1: NPDES Compliance Sampling SOP".

### Sample Types[1]

Two types of sample techniques are routinely used: grab and composite. Each NPDES permit specifies what sample type is to be taken by the permittee. Where practicable, the Inspector will collect the same sample type as required by the NPDES permit.

### Composite Samples[1]

These samples are collected over time, either by continuous sampling or by mixing discrete samples, and represent the average characteristics of the wastestream during the compositing period. Composite samples are collected when stipulated in an NPDES permit. Various methods for compositing samples are available and are based on either time or flow proportioning. Composite samples can be collected manually or with automatic samplers. The Inspector should consider variability in wastestream flow rate and parameter concentrations carefully when choosing compositing methods. The SOP for composite sampling can be found in Appendix C titled "C-2: NPDES ISCO 6700 Series Sampler SOP for Flow-Proportional Sampling Mode", "C-3: NPDES ISCO 6700 Series Sampler SOP for Flow-Weighted Sampling Mode" and "C-3: NPDES ISCO 6700 Series Sampler SOP for Time-Sequential Sampling Mode".

### Grab Samples[1]

Grab samples (Appendix C-5) are individual samples collected over a period of time not exceeding an interval of 15 minutes and represent conditions at the time of sampling. The sample volume depends on the type and number of analyses to be performed.

[1] Standard Methods for the Examination of Water and Wastewater Part 1060 – "Collection and Preservation of Samples"

Sample Matrices

The sample matrix is an aqueous solution. Samples collected are either sanitary wastewater (SW) from municipal wastewater treatment facilities, or non-contact cooling water (NCCW) from industrial facilities or industrial process wastewater (IPW) from industrial facilities (e.g. paper mills, woolen mills, etc.).

Classification of Measured Parameter

Parameters or analytes of interest are those listed in each NPDES permit. Table 5 of the QAPP lists the target analytes of concern. The concentration level for each matrix and parameter can be determined based on previously submitted DMR reports from permittees. Generally, the concentrations are less than the allowable discharge limit in the permit (e.g. 30 mg/L for BOD).

## B2 – Sampling Methods

Required sample containers, sample preservation, and sample holding times for NPDES samples are described in *40 CFR Part 136* and *Standard Methods for the Examination of Water and Wastewater*[5]. Table 7 includes this information. The SOPs describe the procedures for collecting samples, identify equipment and reagents used, and, if applicable, decontamination and/or cleaning procedures.

The sample containers must be made of chemically-resistant material unaffected by the pollutants to be measured. In addition, sample containers must have a closure that will protect the sample from contamination and leakage.

Wastewater samples for chemical analysis generally are collected in plastic (polyethylene) containers. Bacteriological samples must be collected in properly sterilized plastic or glass containers. Samples that contain constituents that will oxidize when exposed to sunlight (such as chlorine) should be collected in dark containers and analyzed immediately (within 15 minutes).

Sample containers shall be clean and uncontaminated. Some SOPs specify container cleaning procedures to be followed. This Program utilizes sampling containers provided by the NHDES Laboratory Services Unit. The lab follows cleaning procedures in accordance with each analytical method's protocol.

The sample volume collected depends on the type and number of analyses needed, as reflected in the parameters to be measured. The sample volume obtained should be sufficient for all required analyses plus an additional amount to provide for any split samples or repeat analyses. Table 7 provides a guide to sample volumes required for analyzing wastewater constituents. The laboratory receiving the sample should be consulted for any specific volume requirement. Typically, the laboratory providing the sample containers provides a container that meets the required sample volume for that analyte. Specific recommended minimum sample volumes for different pollutant parameters can be found in EPA's *Methods for Chemical Analysis of Water and Wastes* (USEPA 1979b) and *Handbook for Sampling and Sample Preservation of Water and Wastewater* (USEPA 1982), and the current EPA-approved edition of *Standard Methods for the Examination of Water and Wastewater*.

In some cases, wastewater samples contain one or more unstable pollutants that require immediate preservation and/or analysis. Appropriate chemical preservation should be provided before samples are

[5] Prepared and published jointly by American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF).

transferred to the laboratory. Table 7 indicates proper sample preservation procedures. For some parameters such as *E. coli* in the presence of chlorine, preservatives must be added to sample bottles prior to or immediately following sample collection. Proper preservation and holding times are essential to ensure sample integrity (see Table 7 and *40 CFR Part 136*).

Prompt analysis is the most positive assurance against error from sample deterioration, but prompt analysis is not feasible for composite samples in which portions may be stored for as long as 24 hours. Therefore, sample preservation must be provided during compositing, usually by refrigeration to 4°C or icing. The automatic samplers used by the Inspectors will be iced accordingly.

**Table 7. Sample Requirements**

| Analytical Parameter | Collection Method | Sampling SOP | Minimum Sample Volume | Container[1] | Container Size and Type | Preservation Requirements[2] | Max. Holding Time (preparation and analysis) |
|---|---|---|---|---|---|---|---|
| TSS | Composite or Grab | Appendix C-2, C-3 or C-4 | 500 mL | P,G | 500 mL white | Cool, 4°C | 7 days |
| $BOD_5$ or $CBOD_5$ | Composite or Grab | Appendix C-2, C-3 or C-4 | 500 mL | P,G | 500 mL white | Cool, 4°C | 48 hours |
| TRC | Grab; field measured | Appendix C-5 and C-7 | 100 mL | P,G | NA | NA | Analyze immediately[3] |
| pH | Grab; field measured | Appendix C-5 and C-6 | 100 mL | P,G | NA | NA | Analyze immediately[3] |
| *E. coli* | Grab | Appendix C-5 and C-9 | 125 mL | P,G | 125 mL sterile | Cool, 4°C 0.008% $Na_2S_2O_3$[4] | 6 hours |
| Coliform, Fecal and Total | Grab | Appendix C-5 and C-9 | 125 mL | P,G | 125 mL sterile | Cool, 4°C 0.008% $Na_2S_2O_3$[4] | 6 hours |
| Turbidity | Grab; field measured | Appendix C-5 and C-8 | 100 mL | P,G | NA | Cool, 4°C | 48 hours |
| Dissolved Oxygen | In-situ; filed measured | Appendix C-11 | NA | NA | NA | None | Analyze immediately[3] |
| Temperature | In-situ; filed measured | Appendix C-11 | NA | NA | NA | None | Analyze immediately[3] |
| Metals, general | Composite or Grab | Appendix C-2, C-3 or C-4 | 500 mL | P(A),G(A) | 500 mL brown | For dissolved metals filter immediately; add $HNO_3$ to pH<2 | 6 months |
| Ammonia as N | Composite or Grab | Appendix C-2, C-3 or C-4 | 250 mL | P,G | 250 mL brown | Analyze ASAP or add $H_2SO_4$ to pH<2 | 28 days |
| Phosphorus, Total | Composite or Grab | Appendix C-2, C-3 or C-4 | 250 mL | P,G | 250 mL brown | Add $H_2SO_4$ to pH<2 | 28 days |

1. P = Plastic (Polyethylene or equivalent); G = Glass; P(A) or G(A) = rinsed with 1+1 $HNO_3$; NA = Not Applicable
2. Samples requiring pH adjustment shall be checked to determine if the required pH level has been achieved.
3. Within 15 minutes 4. Should only be used in the presence of residual chlorine.

The only support facilities needed for this program is the NHDES LSU. The LSU is used to analyze all non-field analytical parameters. If the LSU detects a deviation from test methods, including the reporting of QC results, the laboratory will flag the data and include an explanatory footnote identifying the relevance to data interpretation.

If a failure occurs in the sampling of a facility due to either a power outage, inclement weather, equipment failure, or improper programming of the equipment, the Inspector will be responsible to reschedule the sampling event.

If the Inspector receives an analytical report from the LSU indicating a violation or a potential anomaly, based on the historical data for that facility, the Inspector is responsible to confer this information with the Program Manager. Typically, a follow-up sampling event will be performed to confirm the results. Where a follow-up sample fails to confirm the violation or anomaly, consideration is given as to whether that represents a true change of state of the quality of the wastewater/water, or whether there might have been an analytical error, sample mix-up, or some other error. Where there is doubt as to the integrity of a sample or its analysis, that data shall not be incorporated into the record. In some cases, a second follow-up sample will be required, and will be taken as circumstances dictate.

## B3 – Sample Handling and Custody

Each Inspector is responsible for proper packaging, labeling, possession and transferring of the samples to the NHDES Laboratory Services Unit. Wastewater samples are stored and transported on ice in coolers. The NHDES Laboratory Services Unit staff measures the sample temperature using an infrared sensor and records the temperature on the Chain-of-Custody form at the time of delivery. The samples will be delivered to and analyzed by the laboratory within the required maximum holding time for each parameter.

The most common monitoring errors usually are caused by improper sampling, improper preservation, inadequate mixing during compositing and splitting, and excessive sample holding time. As a check for sample collection techniques, duplicate samples are taken from the same source at the same time. Duplicate samples provide a check on sampling equipment and precision techniques.

The NHDES LSU will also perform its own quality control measures on samples being analyzed. Generally, QA/QC samples are spiked with a known quantity of substance. These QA/QC samples provide a way to verify the accuracy of the analytical procedures.

Table 8 indicates quality control procedures for field analyses and equipment.

**Table 8. Quality Control Procedures for Field Analysis and Equipment**

| Parameter | General | Daily | Quarterly |
|---|---|---|---|
| pH | | | |
| Electrode Method | Report results to nearest 0.01 su and record on Attachment A – Sample Data Summary Sheet | Refer to Appendix C-6 for proper operation and calibration procedures | |
| | | Periodically check the buffers expiration date before the sample run. | |

| Parameter | General | Daily | Quarterly |
|---|---|---|---|
| | | Be on the alert for erratic meter response arising from weak batteries, cracked electrodes, fouling, etc. | Replace or repair as needed |
| | | Rinse electrodes thoroughly between samples and after calibration | |
| Residual Chlorine | | | |
| Colorimetric – DPD Pillows | Report results to nearest 0.01 mg/l and record on Attachment A – Sample Data Summary Sheet | Refer to Appendix C-7 for proper operation and calibration procedures | |
| Turbidity | | | |
| Nephelometric | Report results to nearest 0.1 NTU and record on Attachment A – Sample Data Summary Sheet | Refer to Appendix C-8 for operation and calibration procedures | |
| Nephelometric | | Tubes should always be washed prior to use with a mild detergent, rinsed with distilled water and allowed to air dry in an inverted position. | Tubes should be checked for scratches, cracks or other imperfections such as abrasions. Replace as deemed necessary. |
| Temperature | | | |
| Thermistor sensor | Report results to nearest 0.1 $^{o}$C and record on Attachment A – Sample Data Summary Sheet | Refer to Appendix C-11 for proper operation and calibration procedures | Annually NIST certify the built-in thermometer in the Dissolved Oxygen Meter. |
| Dissolved Oxygen | | | |
| Membrane covered polarographic sensor | Report results to nearest $\pm$ 0.3 mg/l and record on Attachment A – Sample Data Summary Sheet | Refer to Appendix C-11 for proper operation and calibration procedures | Check membrane for wrinkles and air bubbles under membrane. If either condition exists, replace membrane. |
| | | Check calibration chamber to ensure that the small sponge in it is still moist. | |

## B4 – Analytical Methods

Bacteria, TSS, $BOD_5$, $CBOD_5$ ammonia, metals and phosphorus samples are analyzed by the NHDES Laboratory Services Unit (LSU). $BOD_5$ or $CBOD_5$ and bacteria samples are analyzed based upon the expected concentration range in typical sewage unless otherwise requested by the Inspector. Generally, the Inspector will inform the NHDES Laboratory Services Unit of the expected concentration range (based on the facility's operating range) so that the lab knows what dilutions to use when analyzing bacteria, $CBOD_5$ or $BOD_5$.

The analytical methods used in the field are listed in Table 5 and the respective SOPs (including equipment required, calibration frequency, analytical procedure, reagents used, and collection techniques) for each parameter are in Appendix C. If the Program utilizes the NHDES LSU for any of its analytical testing, other than pH, chlorine, temperature, turbidity and dissolved oxygen, the NHDES LSU has its own SOPs and are already on file with the USEPA. When performing analysis on samples from NPDES permitted facilities, the NHDES LSU must adhere to those analytical methods approved in 40 CFR 136.3 which are the same used by the program. The turnaround time for receipt of analytical results from the LSU is satisfactory but not crucial unless it's an enforcement issue. In the latter matter, the Inspector will inquire that the LSU expedite the analysis and note it as a "RUSH" in the comment section of the Chain-of-Custody sheet.

The LSU QA Officer is responsible for resolving any problems with the laboratory method and informing either the Inspector or the Program Manager of the data quality.

The Inspector is responsible for resolving any problems encountered in the field analysis. The Inspector can refer to a corrective action plan specified either in the instrument operating manual or SOP.

## B5 – Quality Control

For each QC activity, the associated method or procedure, acceptance criteria, and corrective action are either noted in each SOP or Section A7. QC activities for the field mainly include the use of blanks, duplicates and standards.

The Program utilizes the LSU for all non-field measured parameters. The QA control required for those parameters can be found in LSU's Quality Systems Manual[6] - State of New Hampshire Department of Environmental Services Laboratory Services Unit (copy on file with the USEPA). The QC activities for the LSU include, but are not limited to, the use of blanks, duplicates, matrix spikes, laboratory control samples, surrogates, or second column confirmation. See Tables 9 through 20 for the LSU's control criteria for each of the wastewater parameters they analyze. The LSU has a more than adequate QA/QC program to monitor and document the accuracy and precision of results and meet reliability requirements. The LSU is a fully accredited National Environmental Laboratory Accreditation Conference (NELAC) laboratory[7].

[6] NHDES Laboratory Quality Systems Manual, Revision 1.2, Dated 2-15-03
[7] Certification Number: 300002-B, Dated 2/25/03

## Table 9: NHDES LSU Analysis QC Sample for $BOD_5$

| **Analytical Method: Standard Method #5210B** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | NA | NA | NA | NA | NA |
| Reagent Blank | 1/run | < 0.2 mg/L | Report qualified data or invalidate data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Contamination |
| Instrument Blank | NA | NA | NA | NA | NA |
| Laboratory Duplicates | 1/batch | Range: 0 – 0.38 mg/L | Report qualified data or invalidate data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1/batch per matrix | Recovery: 88% - 131% | Report qualified data or invalidate data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Interferences |
| Laboratory Control Sample | 1/batch | 3.3 $\pm$ 10% | Report qualified data or invalidate data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank | NA | NA | NA | NA | NA |
| Bottle Blank | 1/run | < 2 mg/L | Report qualified data or invalidate data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Contamination |

NA = Not Applicable

## Table 10: NHDES LSU Analysis QC Sample for TSS

| **Analytical Method: Standard Method #2540D** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | 1/run, in duplicate | $\pm$ 5 mg/L | Correct results based on blank | Analyst, Inorganic Supervisor, Quality Assurance Officer | Drying Effectiveness, method performance |
| Reagent Blank | NA | NA | NA | NA | NA |
| Instrument Blank | NA | NA | NA | NA | NA |
| Laboratory Duplicates | 1/batch | 20% RPD | Repeat sample Qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | NA | NA | NA | NA | NA |
| LCS – level varies per lot | 1/run | 90 $\pm$ 110% | Repeat run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank | NA | NA | NA | NA | NA |

NA = Not Applicable

## Table 11: NHDES LSU Analysis QC Sample for *e. Coli*

| **Analytical Method: Membrane Filter Procedure, EPA 600/4-85/076; Standard Method 9213D.3 (APHA, 1995)** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | Beginning, end, every 10 samples | No growth | Request resample | Microbiology Supervisor, Quality Assurance Officer | Contamination |
| Reagent Blank | NA | | | | |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | About 10% | Not established | | | |
| Laboratory Matrix Spike | NA | | | | |
| Laboratory Control Sample | NA | | | | |
| Laboratory Fortified Blank | NA | | | | |

NA = Not Applicable

## Table 12: NHDES LSU Analysis QC Sample for Total Coliform

| **Analytical Method: Membrane Filter (MF), EPA 600/4-85/076; Standard Method 9222B (APHA, 1995)** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | Beginning, end, every 10 samples | No growth | Request resample | Microbiology Supervisor, Quality Assurance Officer | Contamination |
| Reagent Blank | NA | | | | |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | About 10% | Not established | | | |
| Laboratory Matrix Spike | NA | | | | |
| Laboratory Control Sample | NA | | | | |
| Laboratory Fortified Blank | NA | | | | |

NA = Not Applicable

## Table 13: NHDES LSU Analysis QC Sample for Fecal Coliform

| **Analytical Method: Membrane Filter (MF), EPA 600/4-85/076; Standard Method 9222D.4 (APHA, 1995)** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | Beginning, end, every 10 samples | No growth | Request resample | Microbiology Supervisor, Quality Assurance Officer | Contamination |
| Reagent Blank | NA | | | | |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | About 10% | Not established | | | |
| Laboratory Matrix Spike | NA | | | | |
| Laboratory Control Sample | NA | | | | |
| Laboratory Fortified Blank | NA | | | | |

NA = Not Applicable

## Table 14: NHDES LSU Analysis QC Sample for Ammonia ($NH_3$-N)

| **Analytical Method: Standard Method #4500$NH_3$-B.&G.** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | 1 at beginning, end and every 10 samples | Must be: 0 to <MDL | Invalidate data Run and repeat | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance contamination drift |
| Reagent Blank | NA | NA | NA | NA | NA |
| Instrument Blank | NA | NA | NA | NA | NA |
| Laboratory Duplicates | 1 every 10 samples | 0 – 0.32 mg/L | Re-run, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples | Recovery: 84 – 110% | Re-run, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects (interferences) |
| Laboratory Control Sample | 1/run | 4.11 ($\pm$ 10%) 8.22 ($\pm$ 10%) | Re-analyze a fresh aliquot or re-run whole run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy and method performance |
| Laboratory Fortified Blank | 1/run | 1.0 $\pm$ 10% | Re-analyze a fresh aliquot or re-run whole run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy and method performance |
| Continuing Calibration Verification (mid-point calibration standard) | 1 every 10 samples | 10 $\pm$ 10% | Repeat run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy and method performance |

NA = Not Applicable

## Table 15: NHDES LSU Analysis QC Sample for Total Phosphorous (TP)

| **Analytical Method: EPA 365.2 by Lachat 10-115-01-1-F** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | 1 at beginning, end and every 10 samples | 0 to <MDL | Invalidate the run and repeat | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance, contamination, drift |
| Reagent Blank | NA | NA | NA | NA | NA |
| Instrument Blank | NA | NA | NA | NA | NA |
| Laboratory Duplicates | 1 every 10 samples | Range: 0 – 0.009 | Repeat, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples | Recovery: 86 – 117% | Repeat, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects |
| Laboratory Control Sample | 1/run | 0.100 $\pm$ 10% | Repeat Run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank | 1/run | 0.05 $\pm$ 10% | Repeat Run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy and method performance |
| Continuing Calibration Verification (mid-point calibration standard) | 1 every 10 samples | 0.200 $\pm$ 10% | Repeat run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Drift |

NA = Not Applicable

## Table 16: NHDES LSU Analysis QC Sample for Aluminum (AL)

| **Analytical Method: EPA 200.7** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | NA | | | | |
| Reagent Blank | Beginning, end, every 10 samples | <RDL | Re-cal, re-run | Analyst, Inorganics Supervisor, Quality Assurance Officer | Contamination, drift |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | 1 every 10 samples duplicated | Range: 0 – 0.024 | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples spiked | Recovery: 91 – 106% | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects |
| ICV 2.0 mg/L | 1/run | $\pm$ 10% 1.80 – 2.20 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank 0.500 mg/l | 1/run | $\pm$ 10% 0.450 – 0.550 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance |

NA = Not Applicable

## Table 17: NHDES LSU Analysis QC Sample for Copper (Cu)

| **Analytical Method: EPA 200.8** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | NA | | | | |
| Reagent Blank | Beginning, end, every 10 samples | <RDL | Re-cal, re-run | Analyst, Inorganics Supervisor, Quality Assurance Officer | Contamination, drift |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | 1 every 10 samples duplicated | Duplicate range 0 – 0.004 mg/L | Laboratory duplicates | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples spiked | Recovery: 85 – 105% | Laboratory Matrix Spike | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects |
| ICV 0.020 mg/L | 1/run | $\pm$ 10% 0.018 – 0.022 | ICV 0.020 mg/L | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank 0.050 mg/l | 1/run | $\pm$ 10% 0.045 – 0.055 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance |

NA = Not Applicable

## Table 18: NHDES LSU Analysis QC Sample for Lead (Pb)

| **Analytical Method: EPA 200.8** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | NA | | | | |
| Reagent Blank | Beginning, end, every 10 samples | <RDL | Re-cal, re-run | Analyst, Inorganics Supervisor, Quality Assurance Officer | Contamination, drift |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | 1 every 10 samples duplicated | Duplicate range 0 – 0.004 mg/L | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples spiked | Recovery: 85 – 105% | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects |
| ICV 0.020 mg/L | 1/run | $\pm$ 10% 0.018 – 0.022 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank 0.050 mg/l | 1/run | $\pm$ 10% 0.045 – 0.055 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance |

NA = Not Applicable

## Table 19: NHDES LSU Analysis QC Sample for Silver (Ag)

| **Analytical Method: EPA 200.8** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | NA | | | | |
| Reagent Blank | Beginning, end, every 10 samples | <RDL | Re-cal, re-run | Analyst, Inorganics Supervisor, Quality Assurance Officer | Contamination, drift |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | 1 every 10 samples duplicated | Duplicate range 0 – 0.004 mg/L | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples spiked | Recovery: 85 – 105% | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects |
| ICV 0.020 mg/L | 1/run | $\pm$ 10% 0.018 – 0.022 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank 0.050 mg/l | 1/run | $\pm$ 10% 0.045 – 0.055 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance |

NA = Not Applicable

## Table 20: NHDES LSU Analysis QC Sample for Zinc (Zn)

| **Analytical Method: EPA 200.8** | | **Measurement Performance Criteria** | | **Number of Samples: See NPDES Permit** | |
|---|---|---|---|---|---|
| **Laboratory QC:** | **Frequency/Number** | **Method/SOP QC Acceptable Limits** | **Corrective Action (CA)** | **Person(s) Responsible for CA** | **Data Quality Indicator (DQI)** |
| Method Blank | NA | | | | |
| Reagent Blank | Beginning, end, every 10 samples | <RDL | Re-cal, re-run | Analyst, Inorganics Supervisor, Quality Assurance Officer | Contamination, drift |
| Instrument Blank | NA | | | | |
| Laboratory Duplicates | 1 every 10 samples duplicated | Duplicate range 0 – 0.009 mg/L | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Precision |
| Laboratory Matrix Spike | 1 every 10 samples spiked | Recovery: 79 – 103% | Repeat sample, qualify data | Analyst, Inorganic Supervisor, Quality Assurance Officer | Matrix effects |
| ICV 0.020 mg/L | 1/run | $\pm$ 10% 0.018 – 0.022 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Accuracy |
| Laboratory Fortified Blank 0.050 mg/l | 1/run | $\pm$ 10% 0.045 – 0.055 | Re-cal, re-run | Analyst, Inorganic Supervisor, Quality Assurance Officer | Method performance |

NA = Not Applicable

## B6/B7 – Instrument/Equipment Testing, Inspection, Maintenance, Calibration and Frequency

Field instruments used by the WWEB P&C during wastewater sample collection may include a pH meter, chlorine colorimeter, and if applicable, a turbidity meter, dissolve oxygen meter and/or composite sampler. See the SOPs in Appendix C for applicable calibration procedures for each equipment unit. The WWEB P&C's field instruments and equipment calibration frequency, acceptance criteria and corrective action are shown in Table 21. Spare parts and reagents are kept in the WWEB P&C's office storage cabinet.

The LSU inspects, maintains and calibrates laboratory instruments and equipment in accordance with its "Quality Systems Manual".

**Table 21: Field Instrument/Equipment Calibration Table**

| Equipment name | Procedure | Frequency of calibration | Acceptance criteria | Corrective action | Person responsible |
|---|---|---|---|---|---|
| pH Meter | Appendix C-6 | Daily | 92% to 102% slope<br>± 0.5 units | Repeat calibration with fresh buffers | Inspector |
| Chlorine Colorimeter | Appendix C-7 | NA<br>Factory calibrated | 0-4.0 mg/L | If > 4.0 ppm, dilute the sample | Inspector |
| Turbidity Meter | Appendix C-8 | Daily | 0.00-1100 NTU | If > 1100 NTU, dilute the sample | Inspector |
| Dissolve Oxygen Meter<br><br>DO Temperature Probe | Appendix C-11 | Daily | ± 0.2 mg/L and < 0.5 mg/L DO Standard<br><br>-5 to +45°C<br>± 0.1 units | Refer to manufacturer's manual for troubleshooting | Inspector |
| ISCO Samplers | Appendix C-2, C-3 and C-4 | Automatically calibrates pump curves when programmed | NA | Refer to manufacturer's manual for troubleshooting | Inspector |

## B8 – Inspection/Acceptance Requirements for Supplies and Consumables

Field Inspection: The LSU supplies the necessary sampling containers for the Inspectors to use. The Inspector is responsible to inspect the containers before collecting samples. Bottles that may have been contaminated will be returned to the LSU for cleaning and/or sterilization.

Laboratory Inspection: The procedures used by the LSU to inspect supplies and consumables are described in its Quality Systems Manual.

## B9 – Non-direct Measurements

Data from secondary sources are taken into consideration in the composite sampling of a facility. The secondary data, flow meter readings, is provided by the permittee. Wastewater flow meter readings is used

to calculate flow proportional samples prior to compositing the samples. The permitted facility staff will read and record (manually or electronically) the flow meter totalizer readings over a 24-hour sampling period The total amount of flow discharged over the 24-hour period will be recorded on the "24-hour flow compositing sheet" in Appendix C-3. This flow data is used only for the calculation of flow-weighted samples and is not intended to be used for decision-making nor comparison to an acceptance criteria. The permittee is required to ensure that the meter is annually calibrated by an outside professional vendor. The NPDES Inspection checklist covers the flow meter requirements.

## B10 – Data Management

Data Recording Procedures: Facility information will be recorded on the standardized NPDES Inspection Checklist (Appendix A) and field data would be recorded in a field log book. When completing the NPDES Inspection Checklist, the Inspector will abide by the procedures noted in the NHDES *Quality Management Plan (QMP)* (February 2004 – Revision #4a) sections 6.3 and 8.7, especially the sections excerpted below:

- 6.3.a. The records shall clearly indicate the date of the field observation, sample collection, sample preparation, equipment calibration or testing, and other related activities.
- 6.3.b. The records shall include the identity of personnel involved in making observations, collecting field data, sampling, preparation, calibration, or testing.
- 6.3.c. The record-keeping system shall facilitate the retrieval of all working files and archived records for inspection and verification purposes.
- 6.3.d. All documentation entries shall be signed or initialed by responsible staff. The reason for the signature or initials shall be clearly indicated in the records such as "sampled by", "prepared by", or "reviewed by".
- 6.3.e. All generated data except those that are generated by automated data collection systems, shall be recorded directly, promptly, and legibly in permanent ink.
- 6.3.f. Entries in records shall not be obliterated by methods such as erasure, overwritten files, or markings. All corrections to record-keeping errors shall be made by one line marked through the error and initialed. These criteria also shall apply to electronically maintained records, where applicable.

Manipulations of Raw Data: There will be no manipulations of raw data prior to data entry.

Data Entry Procedures: In accordance with Sections 7.6 and 9.2 of the NHDES QMP, the monthly self-monitoring reports, better known as Discharge Monitoring Reports (DMRs), received from permitted facilities are entered by the Inspector into a Microsoft Access database called "Track 2000". The Inspector reviews the DMR for: (1) is the report correctly completed in accordance with USEPA's DMR instructions, (2) are there any discharge violations, (3) is there an explanation for the violation, and (4) is the report post-marked by the 15$^{th}$ of the month following the monitoring period? There is a DMR database entry screen for each permitted facility. The Track 2000 database system is user friendly and uniquely designed to minimize errors or inconsistencies during data entry. The DMR entry screen contains data insets to input the facility name, month and year, parameter violated, type of violation, analytical unit, permit limit,

analytical result, number of violations, reported properly, post-mark date, and comments. A copy of a DMR entry screen can be viewed in Appendix D.

Inspection data is also entered into the same database system. The inspection entry screen contains data insets to input the facility name, inspection date, inspection type, Inspector name, report date, report type, inspection response received date (facility's response to inspection deficiencies), and findings. A copy of an inspection entry screen can viewed in Appendix D.

Data will be retained by the NHDES WEB P&C personnel. The NPDES Inspection Checklist, NPDES Inspection Worksheets, all attachments and the analytical data are kept in the site/case filing cabinets. The LSU will keep its own separate record of the analytical data.

Data Management: Certain records are maintained electronically – most commonly in the guise of a computer database. Although the "hard-copy" files from which these databases were generated are themselves controlled, the databases or other forms of electronic data management must be adequately backed up, and either updated, or held, as appropriate. An example would be the section of the WWEB P&C database used to hold all of the NPDES permit information. The individual written reports from which this database was generated are maintained in the paper copy files, the disposition of which has already been discussed. The computerized data system, which is uniquely designed to handle data specific to this particular program, have built-in mechanisms to screen for valid data and appropriate data relationships. Records are kept in such a way that they can be relatively easy to retrieve. This applies to both paper and electronic files.

Records are saved to the NHDES network, not to local hard drives, to ensure against the catastrophic loss of electronic data. NHDES requires that all databases be backed up onto remote disks, tapes, or other media, in the event of a computer system failure (see Chapter 7 of the NHDES QMP[8]). The NHDES Information Resources Management Unit (IRMU) maintains the network system.

Data Security: The WWEB P&C database is maintained on password protected computers. Hardcopy files are stored in a secured office with a key-card system (6 Hazen Drive, Concord NH) to which only NHDES employees have access.

Data Analysis: The procedures for data analysis were previously described in Section A7.

## C1 – Assessments and Response Actions

To ensure that field sampling, field analysis and laboratory activities take place as planned, Inspectors and laboratory personnel shall, if necessary, meet to discuss the methods being employed and to review the quality assurance samples. Typically, the sampling protocols and analytical methods are those specified in the NPDES permit or those detailed in a currently EPA-approved *Standard Methods for the Examination of Waster and Wastewater*[9]. The methods used by the permittee's laboratory or its contract laboratory and the Inspector's laboratory should be uniform, thus, eliminating methodology as a variable when data are compared or shared among laboratories.

[8] NHDES Quality Management Plan, Revision #4a, Dated February 2004
[9] Prepared and published jointly by American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF).

Several types of assessment tools are employed by either NHDES or USEPA Region I to ensure the effectiveness of the quality system. These tools are discussed below. NPDES program validity depends on the self-monitoring program quality.

Technical Independent Assessment

USEPA Region I requires all major and selected minor NPDES permittees to annually analyze performance evaluation (PE) samples for many of the parameters in their permit. The analysis of these PE samples is known as the Discharge Monitoring Report-Quality Assurance (DMR-QA) program. The DMR-QA program is an important tool used to ensure the quality of NPDES self-monitoring data. The permittee's analytical laboratory participates in the DMR-QA program. Accuracy data resulting from the DMR-QA program participation are reviewed by USEPA. Results from PE samples are statistically analyzed to provide information on routine laboratory performance and the overall accuracy and bias of the analytical method. Any problems found are addressed by taking appropriate corrective actions to resolve the deficiency(ies). Responding permittees subsequently receive a DMR-QA report showing evaluation of their reported data. Comments and recommendations from these evaluations are used by NHDES and USEPA to take any needed corrective actions.

The DMR-QA Program and the NPDES inspection programs are interdependent in several areas. First, in targeting the inspections, the DMR-QA evaluations of permittee performance can be used, since the evaluations identify potential problems in laboratory analysis or data handling and reporting. This targeting helps to direct limited resources to permittees who need them most. The inspections and DMR-QA results are tracked, and results are provided to the DMR-QA coordinator at USEPA Regional I and WWEB P&C. To track follow-up and complete statistical evaluations properly, a code is provided in EPA's Inspection Report Form 3560-3 (Appendix A-2) to indicate when an inspection is the result of a DMR-QA evaluation (this is shown with the Code Q on the inspection form). Finally, inspections can be used to follow up the DMR-QA program. The DMR-QA results are cross-checked with the permit prior to the onsite visit. The Inspector can then focus on parameters that failed the DMR-QA program while conducting a laboratory inspection, portion of the overall inspection.

Technical Self-Assessment

The Inspector, through inspections, conducts an audit of the permittee's environmental sampling activities. The Inspector has the responsibility to initiate and implement response actions associated with the findings (any significant conditions that would adversely affect the quality and usability of the data) identified during the inspection. Thus, the permittee would be required to properly address the deficiency identified during the audit and provide a corrective action plan as its response. Any changes needed shall be made to ensure consistency and quality of subsequent sampling.

Internal Self-Audit

The NPDES program will conduct an annual internal review/self-audit to verify that operations continue to comply with the requirements of the NHDES QMP, QAPP and SOPs and that non-conformances are corrected and operations continuously improved. The review will be undertaken at the Program level utilizing the guidance in Appendix H of the NHDES QMP. Any deficiencies found within the QAPP or SOPs will be documented in accordance with Chapter 9 of the QMP and the "*NHDES QA System's*

*Guidance on Annual Program Self-Audits*"[10]. This self-audit guidance focuses on the "Check" part of the NHDES QA System. It is developed to help program managers audit their program's quality system using one of the forms and/or worksheets/checklists listed in the guidance. The form (Form A or B) is submitted to the NHDES QA Manager by January 31st of every year.

Assessment frequencies and responsible personnel are shown in Table 22.

**Table 22: Program Assessment Table**

| Assessment Type | Frequency | Person responsible for performing assessment | Person responsible for responding to assessment findings | Person responsible for monitoring effectiveness of corrective actions |
|---|---|---|---|---|
| Field sampling/analytical audit | Once every year | Thomas Croteau NHDES/NPDES Program QA Officer | Thomas Croteau NHDES/NPDES Program QA Officer | Thomas Croteau NHDES/NPDES Program QA Officer |
| Internal Self-Audit | Once every year | Thomas Croteau NHDES/NPDES Program QA Officer | Thomas Croteau NHDES/NPDES Program QA Officer | Sharon Ducharme Program Manager NHDES |
| NHDES Laboratory Services Unit Fixed Lab audit | As specified in QA/QC Plan | Rachel Rainey Lab QA Officer NHDES | Rachel Rainey Lab QA Officer NHDES | Rachel Rainey Lab QA Officer NHDES |

NHDES Laboratory Services Unit Fixed Laboratory Audit: QAPP deviations and program deficiencies determined during the NHDES Laboratory Services Unit fixed laboratory assessments will be addressed immediately. Replicates and critical range tables will be checked with data to determine if error sources exist. Any deviations in results will be addressed in both written and verbal formats, and future sampling will be monitored to verify that compliance is reached.

[10] NHDES Quality Assurance System Guidance On Annual Program Self-Audits, Revision 1, Dated 11/18/02

## C2 – Reports to Management

The reports to management are summarized in the following table.

**Table 23: Reports to Management**

| Report | Frequency | Author | Recipient | Action expected of recipient |
|---|---|---|---|---|
| NPDES Inspection Worksheet(s) | After each inspection | Each Inspector NHDES | NPDES Permitted Facility | Review and respond to deficiencies and identify corrective actions to be taken. |
| NPDES Inspection Checklist and Worksheets | After each inspection | Each Inspector NHDES | Sharon Ducharme Program Manager NHDES | Review report and provide comments before final report is released. |
| NPDES Inspection Worksheet(s) w/response(s) and/or laboratory report | After each inspection | Each Inspector NHDES | Sharon Ducharme Program Manager NHDES | Review report. No violations, file into PCS database system. If violations exist, decide next appropriate step w/USEPA. |
| Final NPDES Inspection Worksheet(s) w/response(s) and EPA 3560-3 Form | After each inspection | Each Inspector NHDES | Joy Hilton USEPA NPDES Program Manager and Sharon Ducharme Program Manager NHDES | Review report. No violations, file into PCS database system. If violations exist, decide next appropriate step. |
| Internal Self-Audit | Annually | NHDES/NPDES Program QA Officer | NHDES QA Manager | Submit audit form by January 31st of each year |

## D1 – Data Review, Verification and Validation

Each Inspector is responsible for conducting the following data review tasks during a compliance sampling inspection (CSI). The Inspector will utilize the QAPP, SOPs and NPDES permit when assessing these activities.

**Table 24: Data Review, Verification, and Validation Tasks**

| Program Activity | Review Activities |
|---|---|
| Sampling Protocol | 1. Check that sampling strategy conforms to the NPDES permit and QAPP.<br>2. Check that selection of sampling locations matches the NPDES permit. |
| Field Sampling | 1. Check use of prescribed procedures and equipment.<br>2. Check that proper containers and preservatives (including proper pH adjustment) were used.<br>3. Check that all samples were properly stored on ice. |
| Field Documentation | 1. Check that proper data entry procedures were used for any field data sheets or notebooks.<br>2. Chain-of-Custody forms: Check that forms are properly completed, signed, and dated during transfer. Check that all samples were assigned identification numbers and accounted for.<br>3. Check that all samples were properly packaged. |
| Field Analytical Testing Data | 1. Check that field instruments were properly calibrated.<br>2. Check calculations, transcriptions, and reporting units for field measurements recorded on any data sheets or notebooks. |
| Laboratory | 1. Check that all requested data is reported, and is in compliance with contract analytical specifications and methods.<br>2. Check that COC documentation from laboratory is correct.<br>3. Check that sample temperatures were $<10^{o}$C upon receipt at laboratory and refrigerated.<br>4. Check that holding times were not exceeded from time of collection to time of analysis.<br>5. Check that QC samples (e.g., duplicate samples) were analyzed.<br>6. If applicable, check that trip and instrument blanks are not contaminated. |
| Program file | Check that the Program file at the WWEB P&C office contains all field and laboratory data for the Program. |

## D2 – Verification and Validation Procedures

The NHDES Laboratory QA Officer is responsible for evaluating results from QC samples and determining whether data quality objectives have been met. Specifically, the NHDES Laboratory QA Officer will:

- Calculate the RPD between duplicate samples to determine if the data quality objectives for precision were met (for more details see Section A7 and B5).
- Ensure that spiked samples are introduced into the train of actual samples at least 10 percent of the time to monitor the performance of the analytical system.
- Review the accuracy control chart that was prepared and used for each analytical procedure.
- Ensure that the laboratory report forms provide complete data documentation and permanent recording, and they facilitate data processing.
- Ensure that laboratory notebooks or pre-printed data forms are bound permanently or otherwise maintained to provide good documentation, including the procedures performed and the details of the analysis, such as the original value recorded, correction factors applied, blanks used, and the reported data values. Dated notes should indicate who performed the analyses and include any abnormalities that occurred during the analytical procedure.

If applicable, the NHDES Laboratory QA Officer will either prepare a memorandum or discuss the findings with the Inspector regarding the data quality. Considering this, the Inspector will discuss this issue with the Program Manager to either determine if this data is adequately reliable or if re-sampling is necessary.

## D3 – Reconciliation with User Requirements

The Program Manager is responsible for reconciling the results from this Program with the requirements of the NPDES Permit Program (the ultimate use of the data). Results that are qualified by the NHDES Laboratory QA Officer may still be used in the NPDES Permit Program if the uncertainty in the results is clearly reported to decision-makers. Because the wastewater samples are collected during specific inspections, additional samples may be collected as needed to confirm any questionable results. To that end, the Inspector will:

1. Review data with respect to sampling design.
2. Review the Data Verification and Validation reports from the NHDES Laboratory QA Officer.
3. Consider how well the data represents actual conditions at the sampling location. Include in the consideration; the original sampling design, sampling methods, and the analytical methods, etc. used.

## References

NPDES Compliance Inspection Manual, USEPA Enforcement and Compliance Assurance, EPA 300-B-94-014. September 1994

Standard Methods for the Examination of Water and Wastewater, 18th Edition 1992. Copyright 1992 by APHA, AWWA and WEF

40 CFR – Chapter I – Part 136, dated May 19, 2003

NHDES Quality Management Plan, Revision #4a, NHDES-C0-01-4, NH Department of Environmental Services, Concord, NH. February 2004.

NHDES (2003) Quality Systems Manual, State of New Hampshire, Department of Environmental Services, Laboratory Services Unit, Concord NH.

NHDES Compliance Assurance Response Policy, NH Department of Environmental Services, Legal Services Unit, Concord NH. September 27, 2000

Methods for Chemical Analysis of Water and Wastes (USEPA 1979b)

Handbook for Sampling and Sample Preservation of Water and Wastewater (USEPA 1982)

Environmental Monitoring and Support Lab (USEPA 600/8-78-017)

# APPENDIX A

## NPDES INSPECTION CHECKLIST
## And
## ATTACHMENTS A - D

**NPDES INSPECTION CHECKLIST[11]**
**FOR**

FACILITY NAME: _____

NPDES PERMIT NUMBER: NH_____

NPDES PERMIT EXPIRATION DATE: _____

## I. PRE-INSPECTION INFORMATION

Permittee's Name: _____ Inspection Date:_____

Inspection Type: CSI CEI RI Closure Facility Type: Major Minor

Type of Treatment Process or Type of Discharge:_____Grade of Municipal Facility: I II III IV

Date of Last Inspection:_____ Type of Last Inspection: CSI CEI RI

Last Inspection Performed by: DES EPA

Name and Title of Responsible Official:_____

Name/Grade of Operator in Responsible Charge:_____

Name/Grade of Back-up Operator in Responsible Charge:_____

Contact (Name/Phone) for Information Regarding Collection System: _____

Time in: _____ Time out: _____

BACKGROUND INFORMATION
*(Complete this section prior to going to facility)*
*(If Closure Inspection, complete Sections II, V, VI, XII, XIV, XV, XVI and XVII only)*

1. YES NO Are the Discharge Monitoring Reports (DMRs) submitted to EPA and DES on time? *(Permit – Part I)* If no, explain: _____
_____

2. YES NO Are the DMRs completed correctly per the EPA instructions? If no, explain: _____
_____

3a. YES NO a) Is the person signing the DMRs authorized to do so per the federal regulations? *(40CFR122.22 (b))* If no, explain: _____

3b. YES NO b) If yes to 3a., has a copy of the authorization letter been sent to EPA and to DES? *(40CFR122.22(c))* Received on (date) _____

[11] Checklist is considered to be the SAP for this Program

4. YES NO NA Has all permit testing been conducted at the correct frequency? *(Permit: Part I)* If no, explain: _____

5. YES NO NA Have all other permit-required reports such as, Whole Effluent Toxicity testing, sludge testing results, pretreatment reports, etc., been completed correctly and submitted on time? *(Permit: Part I)*. If no, explain: _____

6a. YES NO NA Has all noncompliance, which may endanger health or the environment, including all violations of daily limits, a) been orally reported within 24 hours and

6b. YES NO NA b) followed up with a letter to EPA and DES within 5 days? *(Permit Part II, Section D)* If no, explain _____

7. YES NO NA Has the facility explained all permit violations in both the 5-day letters (if applicable) and the DMR submittals? *(Permit Part II, Section D)* If no, explain: _____

8. YES NO NA Has the facility taken corrective action to address all permit violations? *(Permit Part II, Section D)* If no, explain: _____

9. YES NO NA Has the facility complied with all compliance dates in all on-going enforcement cases and/or permit schedules? If no, explain: _____

10. YES NO NA Have there been any backups or overflows in the sanitary sewer collection system, including pump stations, manholes and piping in the last two years? If yes, attach list and review with facility.

## II. OPENING CONFERENCE

***Note: If the facility is unable to meet with you to complete the checklist, perform a site review, sample, and reschedule the remaining portions of the inspection at a mutually agreeable time.***

1. Present credentials/review inspection objectives. *(Objective-To ensure that the facility is being operated as needed to maintain compliance with the facility's NPDES permit)*
2. List people present (Include Inspector Name(s)):

| NAME | TITLE | PHONE # |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

3. E-mail address: _____
4. Permittee's mailing address: _____
5. Facility's mailing address: _____
6. Days/hours manned: M-F/_____Hrs,Time of day: ____AM to ____PM Sat/____Hrs Sun/____Hrs

## III. PERMIT

1. YES NO NA Is a copy of the current permit (Parts I and II and attachments) onsite? *(Recommendation only)* If no, explain: _____

2. YES NO NA If the permit is expired or due to expire within 180 days, has a reapplication package been submitted to DES and EPA *(40CFR122.21)* If no, explain: _____

3. YES NO Is the name of receiving waters correct on the permit? *(40CFR122.21)* If no, explain: _____

4a. YES NO NA a) Do the principal products, production rates, and wastestreams conform to those in
4b. YES NO NA the permit application? b) If no, has EPA approved the change or has the reapplication been updated? *(40CFR122.21)*

5. YES NO Are laboratory method detection limits for all parameters tested less than the permit limits? If no, explain: _____

## IV. RECORDS/REPORTS

1. YES NO NA Are the records and reports maintained by the permittee for at least 3 years? *(40CFR122.21(p), 40CFR122.41(j)(2), Part II)* If no, explain: _____

2. YES NO NA If the facility monitors any permitted parameter more frequently than required by their permit, regardless of the testing method, do they record these results? *(Recommendation for process control)* If no, explain: _____

3. YES NO NA If the facility monitors any permitted parameter more frequently than required by the permit, using approved test methods, do they report these results on their DMRs? *(Permit Part II: Section D.1.d)* If no, explain: _____

4. YES NO NA Is a random check of the reported analytical results consistent with data reported by the permittee on their DMRs? *(Part II Section C)*. If no, explain: _____

5. YES NO NA Has the average monthly flow exceeded 80% of the design flow for 3 consecutive months? *(Permit-Part 1)* If yes, explain and refer information to Design Review Section: _____

## V. FACILITY SITE REVIEW

1. YES NO NA Is there excessive scum buildup, grease, foam, or floating sludge in or on any of the treatment units? If yes, explain: _____ *(Observation)*

2. YES NO NA Are tank weirs level? *(Observation – may impact treatment process)* If no, explain: _____

3. YES NO Is there any indication of a hydraulic overload? *(Observation)* If yes, explain: _____

4. YES NO Are there any noxious odors leaving the site? *(Observation – may indicate process problem or result in complaints from neighbors)* If yes, explain: _____

5. YES NO Is the plant generally clean? *(Observation)* If no, explain: _____

6. YES NO NA Is there any evidence of severe corrosion in any piping or equipment? *(Observation – may result in permit violation or safety hazard)* If yes, explain: _____

7. YES NO NA Are there any breaks or leaks in any chemical feed lines or other piping? *(40CFR 122.41(e)* If yes, explain: _____

8. YES NO NA Is there any surcharging of influent lines, overflow weirs, or other structures? *(Observation – may indicate design problem or blockage or hydraulic overload)* If yes, explain: _____

9. YES NO NA Is there any evidence of septage spills at the septage receiving facility? *(Observation)* If yes, explain: _____

10. YES NO Are there any unpermitted flows entering the groundwater or surface water from either the wastewater treatment facility or the collection system? *(RSA 485-A:13)* If yes, explain: _____

11. YES NO Is there any evidence of potential spills which can contribute pollutants to any storm drains? *(RSA 485-A:13)* If yes, explain: _____

12. YES NO NA Is there any dry weather flow in the stormwater drainage system within the facility? *(Possible violation of RSA 485-A:13 – need to investigate/identify source of flow – actually check drains on site)* If yes, explain: _____

13. YES NO Does the facility have any floor drains? *(Violation of Permit Part I and RSA 485-A:13 if discharge to storm drain system, surface water or ground water unless specifically permitted – ok if discharge to headworks of WWTP)* If yes, where are they and where do they discharge? _____

14. YES NO NA If yes to 13. and the floor drain(s) discharge to the headworks of the treatment plant, are there any chemicals/oil/wastes stored in the vicinity of the floor drain? If yes, explain: _____

(Recommendation only if to headworks – violation cited in 13 if discharge anywhere else – if chemicals spill into headworks, may adversely effect the process and result in permit violations)

## VI. EFFLUENT/RECEIVING WATER

1. YES NO Are the number of outfalls correctly described in the permit? *(40CFR122.21 – need to visually confirm number)* If no, explain: _____

2. YES NO NA Are there any floating solids, oil sheen, color, or foam **in the effluent**? *(Observation)* If yes, explain: _____

3. YES NO NA Are there any floating solids, oil sheen, color, foam or a recognizable plume **in the receiving water**? *(Permit Part I and Env-Ws 1703.03(c))* If yes, explain: _____

4. Collect sample of effluent. Complete Attachment A.

## VII. FLOW MEASUREMENT

1. YES NO NA Are influent and effluent flow measuring device(s) professionally calibrated in accordance with the manufacturer's recommendations? What is the frequency? _____ *(40CFR122.41(e) – should be able to find out frequency in O&M Manual either at plant or in office)* If no, explain: _____

2. YES NO NA Do facility personnel check the calibration between these professional calibrations? *(Recommendation only)* If yes, explain frequency: _____

3. YES NO NA Are all flow measuring devices clean and free of debris and deposits? *(40CFR122.41(e))* If no, explain: _____

4. YES NO NA Are the sides of the flume(s) throat vertical and parallel? *(40CFR122.41(e) – may result in inaccurate flow measurement)* If no, explain: _____

5. YES NO NA Is the effluent weir level? *(40CFR122.41(e) – may result in inaccurate flow measurement)* If no, explain: _____

6. YES NO NA Is there any leakage around any of the flow measuring devices? *(40CFR122.41(e) – may result in inaccurate flow measurement)* If yes, explain: _____

## VIII. SELF MONITORING

1. YES NO Are the influent and effluent sampling locations representative of the wastestream? *(Permit Part I and II, Section C)* If no, explain: _____

2. YES NO Are the correct sample types (grab or composite) taken? *(Permit Part I – composite sample as defined in Part II-Section E)* If no, explain: _____

3. YES NO NA If composite samples are required, are both the influent and effluent samples flow-proportioned? [ ] controlled by flow meter [ ] manually done *(Permit Part II-Section E)* If no, explain: _____

4. YES NO NA Are composite samples cooled to 4°C to properly preserve them during the compositing period? *40CFR136* If no, explain: _____

5a. YES NO NA
5b. YES NO NA a) If the composite sample is cooled with ice or gel packs, do you measure the final composite sample temperature to make sure that the cooling is sufficient? b) Do you record these results? *(40CFR122.41(e), Permit Part II-Section B and 40CFR136)* If no, explain: _____

6a. YES NO NA
6b. YES NO NA
6c. YES NO NA a) If a refrigerator is used for preserving composite samples, is there a thermometer in the refrigerator? b) Is this thermometer checked each time that it is used and are the results of the checks recorded? c) Or, is the final sample temperature measured and the results recorded? *(40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain: _____

7. YES NO NA Are all grab samples cooled with ice or refrigerated to 4°C from the time of collection until analysis including shipping time, if applicable? If no, explain: _____

8. YES NO NA Are all samples which require preservation properly preserved? *(40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain:

9. YES NO Are the correct sample containers being used? *(40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain: _____

10. YES NO Is all the sampling equipment and glassware cleaned before being used? *(40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain: _____

11. YES NO Does the facility's permit require any metals sampling?

12. YES NO NA If yes to 11., does the facility acid wash the sampling containers prior to sample collection as required by the approved analytical methods as required by the facility's permit? If no, explain: _____

## IX. LABORATORY

1. YES NO NA Has a written laboratory QA manual been developed and approved by DES? *(40CFR122.41(e) and Permit Part II-Section B)* (Complete Attachment B if one has not been completed in past 5 years) If yes, provide date Att B completed. If no or NA, explain: _____

2. YES NO NA Is the QA manual being used by facility personnel? If no explain: _____

3. YES NO NA Has the QA manual been updated in the past 5 years? If no, explain: _____

4. YES NO Are the correct analytical testing procedures used and holding times met? *(Permit Part I and 40CFR136)* (Complete Attachment C) If no, explain: _____

5. YES NO NA With each batch of samples analyzed, is the permittee conducting quality control standards, sample duplicates, spikes and blanks? *(Permit Part I and 40CFR136)* (Complete Attachment D) If no explain: _____

6. YES NO NA If the permittee is using alternate analytical procedures, have they been approved by EPA? (*40CFR136)* If no, explain: _____

7. YES NO NA Is the permittee calibrating and maintaining all laboratory instruments and equipment on the periodic basis specified in the Part 136 Analytical Method or in the QA Manual? *(Annual calibrations for thermometers and balances are required – annual calibrations for all other laboratory instruments are recommended but not required) (40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain: _____

8. YES NO NA Are the thermometers annually checked for calibration using a NIST-certified thermometer or do you purchase new NIST-certified thermometers yearly? *(40CFR122.41(e) and Permit Part II-Section B)* If no, explain: _____

9. YES NO NA Are the reagents and standards being used expired? *(Permit Part II-Section B and 40CFR 122.41(e)* If yes, explain: _____

10. YES NO NA Is proper grade laboratory pure water available for specific analysis? *(40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain: _____

11. YES NO NA Are laboratory safety devices (eyewash and shower, fume hood, proper labeling and storage, pipette suction bulbs) available? *(Recommendation only)* If no, explain: ___

12. YES NO NA Are the standard reagents and solvents properly stored? ? *(40CFR122.41(e), 40CFR136 and Permit Part II-Section B)* If no, explain: _____

13. YES NO Does the permittee cross-check its calculations? *(Recommendation – may result in misreporting which is a violation of the permit – DMRs are certified to be accurate by signature)* If no, explain: _____

14. YES NO Does the permittee use the correct lab formulae to calculate final results? (*40CFR136)* If no, explain: _____

## X. OPERATIONS AND MAINTENANCE

1. YES NO NA Does the wastewater treatment facility have an alarm system for all essential equipment? *(Recommendation only)* If no, explain: _____

2. YES NO NA Do you check the facility alarm systems? How often? _____When were the alarm system last checked? _____ *(40CFR122.41(e) and Permit Part II-Section B)*

3. YES NO NA Are routine and preventive maintenance scheduled, performed and recorded? *(40CFR122.41(e) and Permit Part II-Section B)* If no, explain: _____

4. YES NO NA Are all treatment units operable? *(Observation – may result in violation of permit – 40CFR122.41(e))* If no, explain: _____

5. YES NO NA Are emergency phone numbers and notification procedures readily available and posted for EPA and DES and other critical parties? *(Recommendation only)* If no, explain: _____

6. YES NO NA Is a logbook kept which documents all plant activities on a daily basis? *(40CFR122.41(e), Permit Part II-Section B and 40CFR122.41(j)(2))* If no, explain: _____

## XI. PUMP STATIONS

1. YES NO NA Does the facility have any pump stations, public or private, connected to the collection system? If yes, how many are public and how many are private? _____

## XII. SLUDGE/SEPTAGE HANDLING AND DISPOSAL -

**Copy this section for Dick Flanders after every inspection**

**Name of Facility: _____ Date: ___/___/___**
Inspector Name: _____

| | | | | |
|---|---|---|---|---|
| 1. | | | NA | How is the facility's sludge disposed? [ ] incinerated, [ ] composted, [ ] land applied. Provide location of disposal facility. _____ |
| 2. | | | NA | If the facility is not a lagoon, what is the estimated annual amount of sludge (wet tons) provided and what is the frequency of disposal? _____ _____ |
| 3. | YES | NO | NA | Are accurate records of the quantity and quality of the sludge hauled, land-applied, composted, or incinerated kept? *(40CFR122.41(j)(2))* |
| 4. | YES | NO | | Is septage accepted at the facility? If yes, from what towns? _____ _____ If yes, what is the average quantity accepted each month? _____ |
| 5. | | | NA | Where are rags and screening disposed?_____ |
| 6. | YES | NO | NA | Is there a verification process to determine quantity, source and type of septage? *(Such as a voucher with name of homeowner, etc?)* |
| 7. | YES | NO | NA | Are sludge and septage data reported on MOR? *(Municipalities only)* |

## XI1I. STORMWATER

1. YES NO Is the facility a POTW with a design flow greater than 1 MGD, or have an approved pretreatment program?

2. YES NO Is the facility an industry covered under the Multi-Sector General Permit?
*Ask for SIC Code(s) – can confirm with rule in office if coverage unknown.*
*(Observation only)* SIC Code(s) _____

3. YES NO NA If yes to 1. or 2., has the facility applied for coverage under the appropriate MSGP?
*(MSGP – October 2000 or MSGP-Phase II)* If no, explain: _____

4. YES NO NA If yes to 1. or 2., does the facility have a complete Stormwater Pollution Prevention Plan onsite as required by the MSGP? (*MSGP – October 2000 or MSGP-Phase 2)*.
If no, explain and cite as deficiency and refer data to Steve Couto at EPA (617)918-1765: _____

## XIV. SANITARY SEWER OVERFLOWS

1. YES NO NA Have there been any backups or overflows in the sanitary sewer collection system, including pump stations, manholes and piping in the last two years? If yes, explain cause/frequency/locations and corrective actions taken:_____

2. YES NO NA If yes to 1., are these overflows reported to DES and EPA? If no, explain: _____

3. YES NO NA If yes to 1., have any of these overflows impacted surface water? If yes, explain: ____

4. YES NO NA Does the stormwater collection system for the community have any dry weather flows?
*(Possible violation of RSA 485-A:13 – need to investigate/identify source of flow – actually check drains on site)* If yes, explain: _____

5. YES NO NA Does the facility have up-to-date maps/schematics of all stormwater outfalls?
*(Recommendation only)*

## XV. COMBINED SEWER OVERFLOWS

1. YES NO NA Is any portion of the facility's sewage collection system combined with the storm water collection system with designated outfalls? *(Observation only with referral to EPA for follow-up investigation/enforcement)* If yes, explain: _____

2. YES NO NA If yes to 1., are all combined system outfalls identified and permitted in your NPDES permit? *(RSA 485-A:13 – unpermitted discharge)* If no, explain: _____

## XVI. MULTI-MEDIA

***(The following questions are for information gathering purposes only and all information should be referred to the appropriate person immediately following the inspection. No compliance determinations should be made during this inspection for other media programs.)***

1. YES NO Does the facility generate or otherwise handle hazardous waste? If yes, quantity and type of hazardous waste per month:_____

(*Refer data to Tod Leedberg WMD – HW x 2946-note that all hazardous waste needs to be stored in marked, closed containers or tanks)*

2. YES NO Are there any underground storage tanks onsite? If yes, what size are they and what do they contain? _____
*(Refer data to Tom Beaulieu WMD UST Program x2986)*

3a. YES NO Are there any aboveground storage tanks onsite? If yes, what size are they and what do they contain? _____
*(Refer data to Tom Beaulieu WMD UST Program x2986)*

3b. YES NO NA Are the aboveground storage tanks in containment? *(Recommend that all tanks be in containment if potential impact to surface water or to treatment process – also must comply with AST Rules) (Refer data to Mike Juranty WMD AST x6058)*

4. YES NO Is used oil stored on site? If yes, what quantity? _____ Is oil disposed or recycled? _____
*(Refer data to Tim Prospert – WMD Used Oil x7837*

5. YES NO Are there any discharges into or onto the ground? If yes, explain: _____

If yes, is the discharge permitted? List permit type and number: _____
*(Refer data to Mitch Locker – WD UIC – x2858)*

6. YES NO Does the facility have any manufacturing, coating or printing operations that vent to the outside air? If yes, what type of process? _____

Do you know what pollutants are vented to the outside air? _____

_____

*(Refer data to Pam Monroe – ARD Compliance – x0882)*

7. YES NO Does the facility have any fuel burning equipment (i.e. boilers, generators, turbines)? If yes, what size are they (i.e. Heat input, gal/hr, horsepower)? _____

_____

What fuel type (i.e. diesel, #2 or #6 fuel oil, wood, natural gas, propane)? _____

_____

*(Refer data to Pam Monroe – ARD Compliance – x0882)*

8. YES NO Does the facility have a burn pile? If yes, what does pile contain? _____

_____

*(Refer data to Pam Monroe – ARD Compliance – x0882)*

9a. NA If the facility is a lagoon facility, are the lagoons lined or unlined? _____

9b. YES NO NA If unlined, does the facility have a groundwater discharge permit? *(Refer data to Mitch Locker – WD UIC – x2858).* If lined, does the facility have a groundwater release detection permit? *(Refer data to Molly Stark – WMD HWRB – x2890)*

## XVII. CLOSING CONFERENCE

1. Review Findings.
2. Explain what the next steps are.

# Attachment A
## Sample Data Summary – To be completed with every inspection

Facility Name: _____ Date: ___/___/___ Inspector: _____

Sample Type: Grab or Composite Sample Time: _____ Sampler: _____
Sample Location: _____
Is this the normal sample location for the plant effluent sampling? YES or NO If NO, explain: _____

Were split samples collected? YES or NO Comments: _____

Sampling Acknowlegdement: (Operator/other signature): _____Date/Time: _____

On-Site Analyses

| Equipment Calibration | Analysis | Analysis Time | Analysis Method | Analyst | Results | Permit Limit | Sample Observations (Clarity, color, etc) |
|---|---|---|---|---|---|---|---|
| | DO | | 4500–O G | | | | |
| (see DO) | Temperature | | 2550 B | | | | |
| | TRC | | 4500–Cl G | | | | |
| | pH | | 4500-H+ B | | | | |
| | Turbidity | | 2130 B | | | | |
| | | | | | | | |

Laboratory Analyses – attach laboratory report to this Attachment

| Analysis | Analysis Method | Results | Permit Limit | Comments |
|---|---|---|---|---|
| BOD or CBOD | 5210 B | | | |
| TSS | 2540 D | | | |
| E-coli | 9213 D.3 | | | |
| Ammonia, $N_2$ | 350.2 | | | |
| Phosphorus, T | 4500-P B | | | |
| Aluminum, T | 200.7 | | | |

| Analysis | Analysis Method | Results | Permit Limit | Comments |
|---|---|---|---|---|
| Copper, T, TR & D | 200.7 | | | |
| Lead, T, TR & D | 200.7 | | | |
| Zinc, T, TR & D | 200.7 | | | |
| | | | | |
| | | | | |
| | | | | |

T = Total TR = Total Recoverable D = Dissolved

# Quality Assurance/Quality Control Manual Checklist – Attachment B

Facility Name: _____ Date: ___/___/___ Inspector: _____

A. General:

1. Yes No NA Is there a written laboratory QA/QC manual available?

B. Are there Facility specific Laboratory Quality Assurance guidelines:

1. Yes No NA General laboratory water quality?

2. Yes No NA Microbiological laboratory water quality?

3. NA Reagent Quality?
   - Yes No a. Expiration, date of receipt, and opened dates?
   - Yes No b. Handling of reagents?

4. NA Quality Control?
   - Yes No a. Spike or quality control standard?
   - Yes No b. Sample duplicates?
   - Yes No c. Blank on water?

5. Sample collection?
   - Yes No a. Container descriptions?
   - Yes No b. Cleaning procedures?
   - Yes No c. Volume of sample required for analysis?
   - Yes No d. Preservation techniques?
   - Yes No e. Representative sampling times?
   - Yes No f. Consistent and representative sampling locations?
   - Yes No g. Sample collection techniques?
   - Yes No h. Holding time?

6. Sample handling?
   - Yes No NA a. Labeling of bottles
   - Yes No NA b. Chain-of-Custody forms?
   - Yes No NA c. Date and time sample collected?

7. NA Instrument or equipment calibration?
   - Yes No a. Frequency of routine calibration?
   - Yes No b. Frequency of professional calibration?
   - Yes No c. Calibration procedures?

8. Analytical procedures?
   - Yes No a. Cleaning procedures for lab glassware?

| | | | | |
|---|---|---|---|---|
| | Yes | No | | b. Preparation of reagents? |
| | Yes | No | | c. Brief description of the test performed? |
| | Yes | No | | d. Bench sheets? |
| | Yes | No | | e. Reference method number? |
| 9. | | | | Data manipulation and validation? |
| | Yes | No | NA | a. Rule for rounding numerical results? |
| | Yes | No | NA | b. Procedure for handling invalid results? |
| | Yes | No | NA | c. Chart or table available to prompt personnel in units manipulation? |
| | Yes | No | | d. Transcription and calculations check system to include bench sheets, lab books, and DMRs? |
| | Yes | No | | e. Correct MOR and DMR completion? |
| 10. | | | NA | Preventative maintenance procedures and schedules? |
| | Yes | No | | a. A regular, comprehensive maintenance schedule? |
| | Yes | No | | b. List of employees responsible for performing maintenance? |
| | Yes | No | | c. List of duties, with check-off areas to ensure completion? |
| 11. | | | | Corrective action contingencies? |
| | Yes | No | | a. Reasons for unacceptable results? |
| | Yes | No | | b. Estimating impact to receiving water? |
| | Yes | No | | c. Steps to prevent reoccurrence? |
| | Yes | No | | d. Resampling and retesting requirements? |
| | Yes | No | | e. Whom to inform? |
| | Yes | No | | f. Corrective action documentation? |

# Monitoring Data Checklist – Attachment C

Facility Name: _____ Date: ____/____/____ Inspector: _____

| Parameter | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date and Time | | | | | | | | | | | | |
| Sample Location | | | | | | | | | | | | |
| Sample Type [1,2] | | | | | | | | | | | | |
| Sampler | | | | | | | | | | | | |
| Analysis Date and Time [5] | | | | | | | | | | | | |
| Analyst | | | | | | | | | | | | |
| Method No. [3] | | | | | | | | | | | | |
| Results [6] | | | | | | | | | | | | |
| Allowable Holding Time | | | | | | | | | | | | |

1. Grab (G), Composite (8C, 24C)
2. Automatic Flow Proportioned (AFP), Manual Flow Proportioned (MFP)
3. Analysis numbers in current approved edition of Standard Methods
4. For composite samples put time last sample was obtained
5. Time at beginning of analyses
6. Put asterisk next to in-house analyses

# Attachment D
# NPDES Inspection Checklist
# QC for Each Batch of Samples Analyzed

Facility Name: _____ Date: ____/____/____

| | | yes | no | comments |
|---|---|---|---|---|
| **BOD** | effluent (3 dilutions) | ___ | ___ | _____ |
| | dilution water blank | ___ | ___ | _____ |
| | QC standard (e.g., Alpha-trol) | ___ | ___ | _____ |
| | seeded dilution water, if applicable | ___ | ___ | _____ |
| | seed control | ___ | ___ | _____ |
| | duplicate (1 dilution) | ___ | ___ | _____ |
| | spike (1/year) | ___ | ___ | _____ |
| **TSS** | effluent | ___ | ___ | _____ |
| | lab water blank | ___ | ___ | _____ |
| | QC standard (e.g., Alpha-trol) | ___ | ___ | _____ |
| | duplicate | ___ | ___ | _____ |
| | repeat weighing | ___ | ___ | _____ |
| | other: _____ | ___ | ___ | _____ |
| **Bacteria** | effluent (3 dilutions) | ___ | ___ | _____ |
| | dilution water blank | ___ | ___ | _____ |
| | duplicate | ___ | ___ | _____ |
| | quarterly split | ___ | ___ | _____ |
| **pH** | calibration standards (4, 7, 10) | ___ | ___ | _____ |
| | QC standard | ___ | ___ | _____ |
| | effluent | ___ | ___ | _____ |
| | duplicate | ___ | ___ | _____ |
| | other: _____ | ___ | ___ | _____ |
| **TRC** | blank | ___ | ___ | _____ |
| | QC standard | ___ | ___ | _____ |
| | effluent | ___ | ___ | _____ |
| | duplicate | ___ | ___ | _____ |
| **SS** | effluent | ___ | ___ | _____ |
| | duplicate | ___ | ___ | _____ |
| **Other**: _____ | | | | |
| | effluent | ___ | ___ | _____ |
| | QC standard | ___ | ___ | _____ |
| | duplicate | ___ | ___ | _____ |
| | blank | ___ | ___ | _____ |
| | spike | ___ | ___ | _____ |

# APPENDIX A-1

NPDES Inspection Worksheets

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For Inserting
NPDES Worksheets

# APPENDIX A-2

EPA Form 3560-3

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EPA 3560-3 Form

# APPENDIX B

## NHDES Laboratory Services Unit's Chain-of-Custody

**NH DES LABORATORY SERVICES LOGIN AND CUSTODY SHEET**
**(Laboratory Policy: Samples not meeting method requirements will be analyzed at the discretion of the NH DES Laboratory.)**

**Program / Client ID: , In-House, OSA, Pool, Special, Swim, VLAP, NPDES:_____ EPA # / Program #:_____**
**System Name:_____ _____ Site / Town:_____**
**Contact:_____**
Comments:_ _____ Collected By & Phone# _____

| Sample Location /ID | Date/Time Sampled | # of Containers | Matrix | FC Counts | | | | | | | | | | | *Other / Notes* | Lab ID # ( For Lab Use Only ) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| DUP | | | | | | | | | | | | | | | Duplicate of Previous | |

Relinquished By_____Date and Time_____Received By_____

Relinquished By_____Date and Time_____Received By_____

Relinquished By_____Date and Time_____ **Received For Laboratory By**_____

Matrix: A= Air S= Soil AQ= Aqueous ( Ground Water, Surface Water, Drinking Water, Waste Water ) ❒ Other: ____AQ_____

**Page _____ of _____** Data Reviewed By_____ Date_____

Section No.: 22.0
Revision No.: 1
Date: 1-17-01
Page 1 of 1

# APPENDIX C

## Standard Operating Procedures for the NPDES Compliance Monitoring Program

# Appendix C-1

# NPDES Compliance Sampling SOP

1.0. Sample Procedures and Techniques

**Always wear latex gloves when sampling contaminated waters.**

**NOTE: Label all sample bottles prior to filling them. The label information shall include: Date and time sampled, collected by, sample location, parameter(s) to be analyzed and preservative when applicable.**

Prior to the day that composite sampling is to occur, composite sampling equipment must be cleaned in accordance with SOP C-9. Sampling containers such as buckets are rinsed three times with plant wastewater effluent prior to collecting a sample. The sampling/measurement sequence is as follows:

1. Samples requiring no filtration for laboratory analyses are filled first.
2. Samples (e.g. dissolved metals) requiring filtration in the field are prepared next.
3. Field measurements for the following parameters are made after all samples for laboratory analyses have been collected.
    a. pH
    b. Turbidity
    c. Chlorine Residual
    d. Dissolved Oxygen
    e. Temperature

Sample collection is an important part of the NPDES compliance monitoring program. Without proper sample collection procedures, the results of such monitoring programs are neither useful nor valid, even with the most precise and accurate analytical measurements.

2.0 Selection of Representative Sampling Sites

The sample type to be collected are either composites (see Appendix C-2 or C-3 for composite sampling protocol) or grabs (see Appendix C-4 for grab sampling protocol). Each individual NPDES permit specifies the sample type to be performed and the sample location. In some instances, the sampling location specified in the permit or the location chosen by the permittee may not be adequate for the collection of a representative sample. In that case, the Inspector should determine the most representative sampling point available and collect a sample at both locations. Any conflicts in the sampling criteria must be documented and later resolved with the permitting authority (USEPA Region I).

a. Influent samples (reference NPDES permit for applicability)

    These samples should be collected at points of high turbulence flow to ensure good mixing. Sampling points should always be above plant return lines, and sampling equipment should be placed so that the sampling equipment does not interfere with flow measuring devices. The

preferred sampling points for raw wastewater are:

1. Influent pump wet well (if turbulent)
2. Upstream collection lines, tank, or distribution box following pumping from the wet well or sump
3. Influent flume throat
4. Aerated grit chamber

b. Effluent Samples (reference NPDES permit for the referenced outfall pipe)

These samples should be collected at the outfall specified in the NPDES permit or, if no outfall is specified in the NPDES permit, at the most representative site downstream from all entering wastestreams before they enter the receiving waters. For most municipal plants, samples should be collected after chlorination/dechlorination. Occasionally, municipal plant permits may specify sampling prior to chlorination. For these facilities, all parameters can be monitored at the upstream location except for *E. coli*, pH, and total residual chlorine.

Samples can be collected either manual grabs or with automatic samplers (composite only). The following general guidelines apply when taking samples:

1. Collect samples at the outfall specified in the NPDES permit and/or at a site location selected to yield a representative sample.

2. If practicable, use a sampling method (grab, composite, continuous) required in the NPDES permit. Parameters that are not to be collected by automatic samplers, but must be collected as grab samples include total residual chlorine, bacteria, turbidity, dissolved oxygen, temperature and pH. If using an automatic sampler, refer to SOP C-2 or 3 for proper set up procedures.

3. Avoid collecting large non-homogeneous particles and objects while collecting grab samples.

4. Collect the sample facing upstream to avoid contamination.

5. Do not rinse sample container with sample when collecting microbiological samples. Fill the container to within 1 inch of the top.

6. Fill the container (no head space) completely if the sample is to be analyzed for ammonia or phosphorus.

7. Collect sufficient volume to allow for quality assurance testing. (Table 7 in the QAPP provides a guide to various sample volumes, but additional volumes may be necessary for quality assurance testing).

3.0 Sample Handling/Preservation

a. Preserve all samples properly and store the samples in a cooler on ice. Submit the samples to NHDES LSU within the sample holding time appropriate for each analysis. Bacteria samples have a maximum holding time of 6 hours (for more information, call the LSU at 271-3445).

4.0 Quality Assurance/Quality Control (QA/QC)

For quality assurance purposes, a duplicate is collected and analyzed as part of each field sampling event.

# Appendix C-2

## NPDES ISCO 6700 Series Sampler[12] SOP for Flow-Paced Proportional Compositing Sampling Mode (Controlled by a Flow Meter)

1.0 STANDARD PROGRAM: FLOW-PACED PROPORTIONAL COMPOSITE SAMPLING:

One sample collected each time a specified number of flow meter pulses is sensed by the ISCO sampler.

**The 6700 Sampler requires 12-volt DC power. The power source for this model is a 913 High Capacity Power Pack with a 120-volt AC plug. If a 120-volt power source is not readily available, a 934 Nickel Cadmium Battery can be used.**

**NOTE: REMEMBER TO PUT ICE IN THE SAMPLER BEFORE PROGRAMMING**

Place the ice into the center of the bottle kit or around the composite bottle. The amount of ice varies according to the bottle kit used. Always use the retaining rings or hold downs to hold the bottles in position and keep the bottles from floating.

Program the sampler to collect a sample every 10 flow pulses for a total of 24 samples by following these steps:

a.

| 6700 SAMPLER<br>STANDARD PROGRAMMING<br>For HELP at any<br>screen press **?** key. |
|---|

Turn the sampler on by pressing the **On**/Off key (upper left key pad located on the front panel). The On/Off key is labeled with this icon ⏻. The start-up screen appears first and remains on the display for about eight seconds or until you press another key.

b.

| RUN<br>PROGRAM<br>VIEW REPORT<br>OTHER FUNCTIONS |
|---|

This main menu has a list of four options. To enter a sampling program, press an arrow key until PROGRAM blinks. Then press ↵ (Enter) key. *The ↵ (Enter) key always accepts the blinking option.*

c.

| SITE DESCRIPTION:<br>"FACTORY"<br>CHANGE?<br>YES **NO** |
|---|

The option **NO** will be blinking. Press the ↵(Enter) key. For the purposes of this set-up, the site description doesn't need to be changed unless you want to label the site with a name and/or number (see page 20 of the ISCO manual).

[12] Adapted from- ISCO Incorporated. 1997. Model 6700 Portable Samplers: Instruction Manual. ISCO , Lincoln, Nebraska, USA. 157pp.

d.

| |
|---|
| SELECT UNITS FOR LENGTH:<br>**ft** m |

The option **ft** will be blinking, press the ↵ (Enter) key.

e.

| |
|---|
| NUMBER OF BOTTLES:<br>1 2 4 8 12 **24** |

Select the number of bottles in your bottle kit by pressing either arrow key until the correct number blinks (select 24). Press the ↵ (Enter) key.

f.

| |
|---|
| BOTTLE VOLUME IS<br>**500** ML (300-30000) |

Type the bottle volume in your kit and then press ↵ (Enter) key.

g.

| |
|---|
| SUCTION LINE LENGTH<br>IS **10** ft<br>(3-99) |

Type the length of the suction line, then press ↵(Enter) key. If you change the length, the sampler will display a message, 'PLEASE WAIT!…GENERATING PUMP TABLES". Afterwards, the next screen will appear.

h.

| |
|---|
| TIME PACED<br>**FLOW PACED** |

Because this procedure is for flow pacing, select FLOW PACED by pressing an arrow until the option FLOW PACED blinks. Then press ↵ (Enter) key.

i.

| |
|---|
| FLOW BETWEEN<br>SAMPLE EVENTS<br>**10** PULSES (1-9999) |

When programming the sampler for flow pacing using a flow meter, the sampler prompts you to enter an interval number between sample events. Type the number of flow pulses needed and press ↵ (Enter) key.

j.

| |
|---|
| SEQUENTIAL<br>BOTTLES/SAMPLES<br>**SAMPLES/BOTTLE** |

In this program, we want to collect one sample per bottle. Select SAMPLES/BOTTLE by pressing an arrow key until the option SAMPLES/BOTTLES blinks. Then, press ↵ (Enter) key.

k.

| |
|---|
| **1** SAMPLE PER<br>BOTTLE |

Since we want one sample per bottle, enter 1 then, press ↵ (Enter) key.

l.

| |
|---|
| RUN CONTINUOUSLY?<br>YES **NO** |

For this part of the programming, select NO by pressing an arrow until the option blinks. Then, press ↵ (Enter) key. Selecting YES allows the program to run indefinitely by repeating the sample distribution. Continuous sampling assumes that filled bottles are replaced with empty bottles at regular intervals.

m.

| |
|---|
| SAMPLE VOLUME:<br>**400** ml (10-1000) |

Type the volume of the sample you want deposited in each bottle (i.e. if your bottle capacity is 500 ml, type in 400 ml – it's best to leave some space in the bottle. Then, press ↵ (Enter) key.

n.

| |
|---|
| NO DELAY TO START<br>**DELAYED START**<br>CLOCK TIME |

In this program, select DELAYED START by pressing an arrow until the option blinks. Then, press ↵(Enter) key. If you do not want a delay period, then select NO DELAY TO START.

o.

| |
|---|
| FIRST SAMPLE<br>AFTER A **5** MINUTE DELAY<br>(1-999) |

Type the delay period you want between the time you run the program and the time the sampler takes the first sample. For example: If the current time is 10:55 am and you want the sampler to start at 11:00 am, then you enter **5** as the delay. Then, press ↵ (Enter) key

p.

| |
|---|
| PROGRAMMING COMPLETE<br>RUN THIS PROGRAM<br>NOW?<br>**YES** NO |

Run the program immediately by selecting YES. Select NO if you want to run the program later by selecting RUN from the main menu. Press ↵ (Enter) key after making your choice. In this program, YES is selected.

q.

| |
|---|
| PROGRAM WILL START<br>AT 11:00 Mo 23 – SEP<br>10:55 Mo 23 - SEP |

If you selected **YES**, this menu is displayed. In this example, the sampler will start sampling at 11:00 am on Monday, September 23 and the current time and

date are displayed just below the start time and date.

q.

**OR**

| **RUN** |
| --- |
| PROGRAM |
| VIEW REPORT |
| OTHER FUNCTIONS |

If you selected **NO** in step p. above**,** this menu is displayed. The word **Run** will be blinking. To start the program, press the ↵ (Enter) key.

The sampler will now operate, collect 400 ml samples every 10 flow meter pulses and deposit the sample in the bottle and continue operating until all 24 bottles are filled.

2.0 Quality Assurance/Quality Control (QA/QC)

Check the pump tubing for cracks or pin holes. Replace the pump tubing if necessary and reset the pump tubing warning. (See *Checklist for Replacing Pump Tube* on page 74 of the owner's manual.) Route the suction line so that the line runs continuously downhill from the sampler to the liquid source. This helps drain the line during pre-sample and post-sample purges. For representative samples, place the intake in the main current of the flow stream, not in an eddy or at an edge of flow. Placing the intake strainer at the bottom may produce samples with excess heavy solids and no floating materials, while placement at the top may produce the opposite conditions. Place the sampler on a relatively flat, horizontal surface.

3.0 Cleaning/Maintenance Procedures

Refer to SOP C-9 or manufacturer's manual.

4.0 Decontamination

Decontamination of the equipment is required prior to equipment service. Routine decontamination after each sampling event is performed in accordance with SOP C-10.

# Appendix C-3

## NPDES ISCO 6700 Series Sampler[1] SOP for Flow-Weighted Proportional Compositing Sampling Mode (Not Controlled by a Flow Meter)

1.0 STANDARD PROGRAM: TIME-SEQUENTIAL[2] COMPOSITE SAMPLES FORMED INTO A FLOW-WEIGHTED COMPOSITE SAMPLE:

Discrete samples collected in individual containers at constant time intervals (time-sequential sampling) that can be manually flow-proportioned to form the composite sample (flow-weighted sample) by following the steps in Section 2.0 below.

**The 6700 Sampler requires 12-volt DC power. The power source for this model is a 913 High Capacity Power Pack with a 120-volt AC plug. If a 120-volt power source is not readily available, a 934 Nickel Cadmium Battery can be used.**

**NOTE: REMEMBER TO PUT ICE IN THE SAMPLER BEFORE PROGRAMMING**

Place the ice into the center of the bottle kit or around the composite bottle. The amount of ice varies according to the bottle kit used. Always use the retaining rings or hold downs to hold the bottles in position and keep the bottles from floating.

Program the sampler to collect a sample every hour for the next 24 hours by following these steps:

a.

| 6700 SAMPLER<br>STANDARD PROGRAMMING<br>For HELP at any<br>screen press **?** key. |
|---|

Turn the sampler on by pressing the **On**/Off key (upper left key pad located on the front panel). The On/Off key is labeled with this icon ⏻. The start-up screen appears first and remains on the display for about eight seconds or until you press another key.

b.

| RUN<br>PROGRAM<br>VIEW REPORT<br>OTHER FUNCTIONS |
|---|

This main menu has a list of four options. To enter a sampling program, press an arrow key until PROGRAM blinks. Then press ↵ (Enter) key. *The ↵ (Enter) key always accepts the blinking option.*

[1] Adapted from- ISCO Incorporated. 1997. Model 6700 Portable Samplers: Instruction Manual. ISCO , Lincoln, Nebraska, USA. 157pp.

[2] Time-Sequential means discrete samples collected in individual containers at constant time intervals.

c.

| |
|---|
| SITE DESCRIPTION:<br>"FACTORY"<br>CHANGE?<br>YES **NO** |

The option **NO** will be blinking. Press the ↵(Enter) key. For the purposes of this set-up, the site description doesn't need to be changed unless you want to label the site with a name and/or number (see page 20 of the ISCO manual).

d.

| |
|---|
| SELECT UNITS FOR LENGTH:<br>**ft** m |

The option **ft** will be blinking, press the ↵ (Enter) key.

e.

| |
|---|
| NUMBER OF BOTTLES:<br>1 2 4 8 12 **24** |

Select the number of bottles in your bottle kit by pressing either arrow key until the correct number blinks (select 24). Press the ↵ (Enter) key.

f.

| |
|---|
| BOTTLE VOLUME IS<br>**500** ML (300-30000) |

Type the bottle volume in your kit and then press ↵ (Enter) key.

g.

| |
|---|
| SUCTION LINE LENGTH<br>IS **10** ft<br>(3-99) |

Type the length of the suction line, then press ↵(Enter) key. If you change the length, the sampler will display a message, 'PLEASE WAIT!…GENERATING PUMP TABLES". Afterwards, the next screen will appear.

h.

| |
|---|
| **TIME PACED**<br>FLOW PACED |

Because we want samples based on time intervals, select TIME PACED by pressing an arrow until the option TIME PACED blinks. Then press ↵ (Enter) key.

i.

| |
|---|
| TIME BETWEEN<br>SAMPLE EVENTS<br>**1** HOURS, **0** MINUTES |

For this example, type 1 for hours and press ↵ (Enter) key. Type 0 for minutes and press ↵ (Enter) key. Tip: Move back and forth between hours and minutes by pressing an arrow key.

j.

| |
|---|
| **SEQUENTIAL**<br>BOTTLES/SAMPLES<br>SAMPLES/BOTTLE |

Because this program requires one sample in each bottle, select SEQUENTIAL by pressing an arrow key until the option SEQUENTIAL blinks. Then, press ↵ (Enter) key.

k.

| |
|---|
| RUN CONTINUOUSLY?<br>YES **NO** |

For this part of the programming, select NO by pressing an arrow until the option blinks. Then, press ↵ (Enter) key. Selecting YES allows the program to run indefinitely by repeating the sample distribution. Continuous sampling assumes that filled bottles are replaced with empty bottles at regular intervals.

l.

| |
|---|
| SAMPLE VOLUME:<br>**400** ml (10-1000) |

Type the volume of the sample you want deposited in each bottle (i.e. if your bottle capacity is 500 ml, type in 400 ml – it's best to leave some space in the bottle. Then, press ↵ (Enter) key.

m.

| |
|---|
| NO DELAY TO START<br>**DELAYED START**<br>CLOCK TIME |

In this program, select DELAYED START by pressing an arrow until the option blinks. Then, press ↵(Enter) key. If you do not want a delay period, then select NO DELAY TO START.

n.

| |
|---|
| FIRST SAMPLE<br>AFTER A **5** MINUTE DELAY<br>(1-999) |

Type the delay period you want between the time you run the program and the time the sampler takes the first sample. For example: If the current time is 10:55 am and you want the sampler to start at 11:00 am, then you enter **5** as the delay. Then, press ↵ (Enter) key

o.

| |
|---|
| PROGRAMMING COMPLETE<br>RUN THIS PROGRAM<br>NOW?<br>**YES** NO |

Run the program immediately by selecting YES. Select NO if you want to run the program later by selecting RUN from the main menu. Press ↵ (Enter) key after making your choice. In this program, YES is selected.

p.

| |
|---|
| PROGRAM WILL START<br>AT 11:00 Mo 23 – SEP<br>10:55 Mo 23 - SEP |

If you selected **YES**, this menu is displayed. In this example, the sampler will start sampling at 11:00 am on Monday, September 23 and the current time and

date are displayed just below the start time and date.

p. **OR**

| |
|---|
| **RUN** |
| PROGRAM |
| VIEW REPORT |
| OTHER FUNCTIONS |

If you selected **NO** in step p. above**,** this menu is displayed. The word **Run** will be blinking. To start the program, press the ↵ (Enter) key.

The sampler will now operate in a time-sequential mode, collect a 400 ml sample every hour and deposit the sample in each bottle and continue operating until all 24 bottles are filled.

## 2.0 TIME-SEQUENTIAL DISCRETE SAMPLES FORMED INTO A FLOW-WEIGHTED[1] COMPOSITE SAMPLE:

The time-sequential samples collected in Section 1.0 can be manually flow-proportioned to form the flow-weighted composite sample. There are two procedures that can be used to perform this function.

a. Totalizer readings recorded during the sampling period can be used to perform a flow-weighted composite sample using the discrete samples collected in Section 1.0 above. A specified volume of each discrete sample is measured and made proportional to the flow at the time the sample was collected. Each measured sample is combined in a single large container to form a composite sample. Table I shows an example where each hourly totalizer readings were recorded and used to calculate the sample volume. In this example, 100 mLs of sample was measured for every 10,000 gallons per day of flow for a total volume of 4500 mLs . If 100 mLs is either too much or not enough, try decreasing or increasing respectively.

[1] Flow-weighted means a composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is manually made flow-proportioned to form the composite sample.

**Table I**

| TIME | METER READING | CHANGE IN FLOW, GPH | SAMPLE[3], ml |
|---|---|---|---|
| 8:00 A.M. | 1,500,000 | | |
| 9:00 A.M. | 1,520,000 | 20,000 | 200 |
| 10:00 A.M. | 1,535,000 | 15,000 | 150 |
| 11:00 A.M. | 1,565,000 | 30,000 | 300 |
| NOON | 1,600,000 | 35,000 | 350 |
| 1:00 P.M. | 1,635,000 | 35,000 | 350 |
| 2:00 P.M. | 1,665,000 | 30,000 | 300 |
| 3:00 P.M. | 1,685,000 | 20,000 | 200 |
| 4:00 P.M. | 1,700,000 | 15,000 | 150 |
| 5:00 P.M. | 1,730,000 | 30,000 | 300 |
| 6:00 P.M. | 1,755,000 | 25,000 | 250 |
| 7:00 P.M. | 1,780,000 | 25,000 | 250 |
| 8:00 P.M. | 1,800,000 | 20,000 | 200 |
| 9:00 P.M. | 1,820,000 | 20,000 | 200 |
| 10:00 P.M. | 1,835,000 | 15,000 | 150 |
| 11:00 P.M. | 1,845,000 | 10,000 | 100 |
| Midnight | 1,855,000 | 10,000 | 100 |
| 1:00 A.M. | 1,860,000 | 5,000 | 50 |
| 2:00 A.M. | 1,865,000 | 5,000 | 50 |
| 3:00 A.M. | 1,870,000 | 5,000 | 50 |
| 4:00 A.M. | 1,880,000 | 10,000 | 100 |
| 5:00 A.M. | 1,895,000 | 15,000 | 150 |
| 6:00 A.M. | 1,910,000 | 15,000 | 150 |
| 7:00 A.M. | 1,930,000 | 20,000 | 200 |
| 8:00 A.M. | 1,950,000 | 20,000 | 200 |
| | | Composite Sample Size, mL = | 4500 |

b. Flow readings recorded on a chart recorder during the sampling period can be used to perform a flow-weighted composite sample using the discrete samples collected in Section 1.0 above. A specified volume of each discrete sample is measured and made proportional to the flow at the time the sample was collected. Each measured sample is combined in a single large container to form a composite sample. The following '24-Hour Flow Proportional Compositing' sheet can be used to calculate the volume of sample for hourly flow readings. Flow readings are entered on the sheet as percentages based on the maximum flow reading recorded during the sampling period. As an example, the following compositing sheet has been filled out using 375 mLs as the sample volume for the maximum flow reading.

## 24 Hour Flow Proportional Compositing

Facility Name: Anytown Wastewater Plant  Location: Anytown, NH
First sample at: 8:00 am  Date: 7/10/02  Final Sample at: 7:00 am  Date: 7/11/02
Maximum Chart Reading: 700,000 gallons

| Time | Flow | % of maximum flow **x** | mL | = amount from | Bottle # |
|---|---|---|---|---|---|
| 8:00 | 350,000 | 0.50 | 375 | 188 | 1 |
| 9:00 | 375,000 | 0.53 | 375 | 199 | 2 |
| 10:00 | 378,000 | 0.54 | 375 | 202 | 3 |
| 11:00 | 430,000 | 0.61 | 375 | 229 | 4 |
| Noon | 460,000 | 0.66 | 375 | 248 | 5 |
| 1:00 | 560,000 | 0.80 | 375 | 300 | 6 |
| 2:00 | 658,000 | 0.94 | 375 | 353 | 7 |
| 3:00 | 700,000 | 1.00 | 375 | 375 | 8 |
| 4:00 | 665,000 | 0.95 | 375 | 356 | 9 |
| 5:00 | 650,000 | 0.93 | 375 | 349 | 10 |
| 6:00 | 620,000 | 0.88 | 375 | 330 | 11 |
| 7:00 | 620,000 | 0.88 | 375 | 330 | 12 |
| 8:00 | 550,000 | 0.78 | 375 | 376 | 13 |
| 9:00 | 495,000 | 0.71 | 375 | 266 | 14 |
| 10:00 | 400,000 | 0.57 | 375 | 214 | 15 |
| 11:00 | 395,000 | 0.56 | 375 | 210 | 16 |
| Midnite | 325,000 | 0.46 | 375 | 173 | 17 |
| 1:00 | 275,000 | 0.39 | 375 | 146 | 18 |
| 2:00 | 275,000 | 0.39 | 375 | 146 | 19 |
| 3:00 | 245,000 | 0.35 | 375 | 131 | 20 |
| 4:00 | 225,000 | 0.32 | 375 | 120 | 21 |
| 5:00 | 230,000 | 0.33 | 375 | 124 | 22 |
| 6:00 | 290,000 | 0.41 | 375 | 154 | 23 |
| 7:00 | 335,000 | 0.48 | 375 | 180 | 24 |
| | | | Total volume = | 5,699 mLs | |

Total flow for the day: 573,750 gallons

## 3.0 Quality Assurance/Quality Control (QA/QC)

Check the pump tubing for cracks or pin holes. Replace the pump tubing if necessary and reset the pump tubing warning. (See *Checklist for Replacing Pump Tube* on page 74 of the owner's manual.) Route the suction line so that the line runs continuously downhill from the sampler to the liquid source. This helps drain the line during pre-sample and post-sample purges. For representative samples, place the intake in the main current of the flow stream, not in an eddy or at an edge of flow. Placing the intake strainer at the bottom may produce samples with excess heavy solids and no floating materials, while placement at the top may produce the opposite conditions. Place the sampler on a relatively flat, horizontal surface.

## 4.0 Cleaning/Maintenance Procedures

Refer to SOP C-9 or manufacturer's manual.

## 5.0 Decontamination

Decontamination of the equipment is required prior to equipment service. Routine decontamination after each sampling event is performed in accordance with SOP C-10.

# Appendix C-4

## NPDES ISCO 6700 Series Sampler[1] SOP for Time-Sequential Composite Sampling Mode

## 1.0 STANDARD PROGRAM: TIME-SEQUENTIAL[2] COMPOSITE SAMPLES:

Discrete samples collected in individual containers at constant time intervals. This method is appropriate when the flow is constant (flow rate does not vary more than ± 10 percent of the average flow rate) or when flow monitoring equipment is not available.

**The 6700 Sampler requires 12-volt DC power. The power source for this model is a 913 High Capacity Power Pack with a 120-volt AC plug. If a 120-volt power source is not readily available, a 934 Nickel Cadmium Battery can be used.**

**NOTE: REMEMBER TO PUT ICE IN THE SAMPLER BEFORE PROGRAMMING**

Place the ice into the center of the bottle kit or around the composite bottle. The amount of ice varies according to the bottle kit used. Always use the retaining rings or hold downs to hold the bottles in position and keep the bottles from floating.

Program the sampler to collect a sample every hour for the next 24 hours by following these steps:

a.

| 6700 SAMPLER<br>STANDARD PROGRAMMING<br>For HELP at any<br>screen press **?** key. |
|---|

Turn the sampler on by pressing the **On**/Off key (upper left key pad located on the front panel). The On/Off key is labeled with this icon ⏻. The start-up screen appears first and remains on the display for about eight seconds or until you press another key.

b.

| RUN<br>PROGRAM<br>VIEW REPORT<br>OTHER FUNCTIONS |
|---|

This main menu has a list of four options. To enter a sampling program, press an arrow key until PROGRAM blinks. Then press ↵ (Enter) key. *The ↵ (Enter) key always accepts the blinking option.*

c.

| SITE DESCRIPTION:<br>"FACTORY"<br>CHANGE?<br>YES **NO** |
|---|

The option **NO** will be blinking. Press the ↵(Enter) key. For the purposes of this set-up, the site description doesn't need to be changed unless you want

[1] Adapted from- ISCO Incorporated. 1997. Model 6700 Portable Samplers: Instruction Manual. ISCO , Lincoln, Nebraska, USA. 157pp.
[2] Time-Sequential means discrete samples collected in individual containers at constant time intervals.

to label the site with a name and/or number (see page 20 of the ISCO manual).

d.

| |
|---|
| SELECT UNITS FOR LENGTH:<br>**ft** m |

The option **ft** will be blinking, press the ↵ (Enter) key.

e.

| |
|---|
| NUMBER OF BOTTLES:<br>1 2 4 8 12 **24** |

Select the number of bottles in your bottle kit by pressing either arrow key until the correct number blinks (select 24). Press the ↵ (Enter) key.

f.

| |
|---|
| BOTTLE VOLUME IS<br>**500** ML (300-30000) |

Type the bottle volume in your kit and then press ↵ (Enter) key.

g.

| |
|---|
| SUCTION LINE LENGTH<br>IS **10** ft<br>(3-99) |

Type the length of the suction line, then press ↵(Enter) key. If you change the length, the sampler will display a message, 'PLEASE WAIT!…GENERATING PUMP TABLES". Afterwards, the next screen will appear.

h.

| |
|---|
| **TIME PACED**<br>FLOW PACED |

Because we want samples based on time intervals, select TIME PACED by pressing an arrow until the option TIME PACED blinks. Then press ↵ (Enter) key.

i.

| |
|---|
| TIME BETWEEN<br>SAMPLE EVENTS<br>**1** HOURS, **0** MINUTES |

For this example, type 1 for hours and press ↵ (Enter) key. Type 0 for minutes and press ↵ (Enter) key. Tip: Move back and forth between hours and minutes by pressing an arrow key.

j.

| |
|---|
| **SEQUENTIAL**<br>BOTTLES/SAMPLES<br>SAMPLES/BOTTLE |

Because this program requires one sample in each bottle, select SEQUENTIAL by pressing an arrow key until the option SEQUENTIAL blinks. Then, press ↵ (Enter) key.

k.

| |
|---|
| RUN CONTINUOUSLY?<br>YES **NO** |

For this part of the programming, select NO by pressing an arrow until the option blinks. Then, press ↵ (Enter) key. Selecting YES allows the program to run indefinitely by repeating the sample distribution. Continuous sampling assumes that filled bottles are replaced with empty bottles at regular intervals.

l.

| |
|---|
| SAMPLE VOLUME:<br>**400** ml (10-1000) |

Type the volume of the sample you want deposited in each bottle (i.e. if your bottle capacity is 500 ml, type in 400 ml – it's best to leave some space in the bottle. Then, press ↵ (Enter) key.

m.

| |
|---|
| NO DELAY TO START<br>**DELAYED START**<br>CLOCK TIME |

In this program, select DELAYED START by pressing an arrow until the option blinks. Then, press ↵(Enter) key. If you do not want a delay period, then select NO DELAY TO START.

n.

| |
|---|
| FIRST SAMPLE<br>AFTER A **5** MINUTE DELAY<br>(1-999) |

Type the delay period you want between the time you run the program and the time the sampler takes the first sample. For example: If the current time is 10:55 am and you want the sampler to start at 11:00 am, then you enter **5** as the delay. Then, press ↵ (Enter) key

o.

| |
|---|
| PROGRAMMING COMPLETE<br>RUN THIS PROGRAM<br>NOW?<br>**YES** NO |

Run the program immediately by selecting YES. Select NO if you want to run the program later by selecting RUN from the main menu. Press ↵ (Enter) key after making your choice. In this program, YES is selected.

p.

| |
|---|
| PROGRAM WILL START<br>AT 11:00 Mo 23 – SEP<br>10:55 Mo 23 - SEP |

If you selected **YES**, this menu is displayed. In this example, the sampler will start sampling at 11:00 am on Monday, September 23 and the current time and date are displayed just below the start time and date.

p.

**OR**

| |
|---|
| **RUN** |
| PROGRAM |
| VIEW REPORT |
| OTHER FUNCTIONS |

If you selected **NO** in step p. above**,** this menu is displayed. The word **Run** will be blinking. To start the program, press the ↵ (Enter) key.

The sampler will now operate in a time-sequential mode, collect a 400 ml sample every hour and deposit the sample in each bottle and continue operating until all 24 bottles are filled.

## 2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Check the pump tubing for cracks or pin holes. Replace the pump tubing if necessary and reset the pump tubing warning. (See *Checklist for Replacing Pump Tube* on page 74 of the owner's manual.) Route the suction line so that the line runs continuously downhill from the sampler to the liquid source. This helps drain the line during pre-sample and post-sample purges. For representative samples, place the intake in the main current of the flow stream, not in an eddy or at an edge of flow. Placing the intake strainer at the bottom may produce samples with excess heavy solids and no floating materials, while placement at the top may produce the opposite conditions. Place the sampler on a relatively flat, horizontal surface.

## 3.0 CLEANING/MAINTENANCE PROCEDURES

Refer to SOP C-9 or manufacturer's manual.

## 4.0 Decontamination

Decontamination of the equipment is required prior to equipment service. Routine decontamination after each sampling event is performed in accordance with SOP C-10.

# C-5

# NPDES Grab Sampling SOP

## 1.0 GRAB SAMPLES

**Always wear latex gloves when sampling contaminated waters.**

**NOTE: Label all sample bottles prior to filling them. The label information shall include: Date and time sampled, collected by, sample location, parameter(s) to be analyzed and preservative if applicable.**

Grab samples are individual samples collected over a period of time not exceeding 15 minutes and are representative of conditions at the time the sample is collected. The sample volume depends on the type and number of analyses to be performed (see Table 7 in the QAPP). The collection of a grab sample is appropriate when a sample is needed to:

a. Sample an effluent discharge that is not on a continuous basis.
b. Provide information about instantaneous concentrations of pollutants at a specific time.
c. Monitor parameters not amenable to compositing (e.g., pH, dissolve oxygen, temperature, chlorine, bacteria and others that may be specified in the NPDES permit).

In lieu of composite samples, grab samples may also periodically be collected and analyzed for $BOD_5$ or $CBOD_5$, TSS or other wastewater constituents as a screening tool for wastewater treatment plant performance.

Follow these procedures for grab samples submitted to NHDES Laboratory Services Unit and for field analysis.

## 2.0 SELECTION OF REPRESENTATIVE SAMPLING SITES

Samples should be collected at the location specified in each individual NPDES Permit. In some instances, the sampling location specified in the permit or the location chosen by the permittee may not be adequate for the collection of a representative sample. In that case, the Inspector should determine the most representative sampling point available and collect a sample at both locations. Any conflicts in the sampling criteria must be documented and later resolved with the permitting authority (USEPA Region I).

a. Influent samples

   These samples should be taken at points of high turbulence flow to ensure good mixing. Sampling points should always be above plant return lines, and sampling equipment should be placed so that the sampling equipment does not interfere with flow measuring devices. The preferred sampling points for raw wastewater are:

   1. Influent pump wet well (if turbulent)

2. Upstream collection lines, tank, or distribution box following pumping from the wet well or sump
3. Influent flume throat
4. Aerated grit chamber

b. Effluent Samples

These samples should be collected at the outfall specified in the NPDES permit or, if no outfall is specified in the NPDES permit, at the most representative site downstream from all entering wastestreams before they enter the receiving waters. For most municipal plants, samples should be collected after chlorination/dechlorination. The following parameters are collected as grab field samples: bacteria, pH, turbidity, dissolve oxygen (in-situ), temperature (in-situ), and total residual chlorine. Appendix C contains the SOPs for each of these analytical tests.

The following general guidelines apply when collecting grab samples:

1. Collect grab samples at the outfall specified in the NPDES permit and/or at a site location selected to yield a representative sample.
2. Avoid collecting large non-homogeneous particles and objects.
3. Collect the sample facing upstream to avoid contamination
4. Do not rinse sample container with sample when collecting bacteria samples due to the dechlorinating agent in the container. Fill the container directly but do not overfill (leave a small air space). If overfilled, grab another sample container and try again.
5. Collect sufficient volume to allow for quality assurance testing. (Table 7 provides a guide to numerous sample volumes, but additional volumes may be necessary for quality assurance testing).

## 3.0 SAMPLE HANDLING/PRESERVATION

a. Preserve all samples properly with ice and submit the samples to the NHDES Laboratory Services Unit within the sample holding time appropriate to each test (for more information, call NHDES Laboratory Services Unit at 271-3445).

## 4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

For quality assurance purposes, a duplicate is collected and analyzed as part of each field sampling event.

# C-6

# NPDES pH Analysis SOP

## 1.0 EQUIPMENT

a. Orion Model 230A pH meter[1] (pH meter) with an Automatic Temperature Compensation (ATC) low maintenance electrode (probe).
b. If available, magnetic stirrer with magnetic stirring bars.
c. Beakers for samples.
d. Unexpired buffers.
e. Lint free wipes.
f. Bottle of de-ionized water
g. Latex gloves

## 2.0 BUFFERS

Buffers 4.01, 7.00 and 10.01

## 3.0 pH METER CALIBRATION PROCEDURES

*Note: The procedures outlined in Sections a, b, and c, below, are performed prior to collecting a sample.*

a. Inspect and/or clean the pH electrode

1. Gently remove the probe[2] from the electrode storage compartment. Clean any salty deposits off by rinsing the probe with de-ionized water. Blot dry with a wipe.

2. Visually inspect the glass bulb for scratches and cracks, and inspect the probe cord port for salt deposits. Remove deposits as necessary with de-ionized water and blot dry with a wipe

3. Shake air bubbles from the measurement end (bulb location), by gently tapping the outside of the probe against your finger.

4. Continue with the calibration procedures outlined in Section 3.0, b, below.

b. Calibration

[1] Adapted from - Orion Research Incorporated. 1991. Model 230A Meter: Instruction Manual. Orion Research Incorporated, Beverly, MA, USA. 60pp.
[2] Adapted from - Orion Research Incorporated. 1996. Low Maintenance Triode pH electrode Model 9107BN: Instruction Manual. Orion Research Incorporated, Beverly, MA, USA. 15pp.

A two buffer calibrations should be performed before pH is measured. Use two buffers that bracket the expected sample range.

There are two ways of calibrating the pH meter: auto-calibration or manual calibration. The following are the instructions for the auto-calibration method. Auto-calibration is a feature of the pH meter that automatically recognizes the buffers 7.00, 4.01, and 10.01 within a range of $\pm$ 0.5 pH units.

c. Auto-Calibration

1. Choose either 4.01 and 7.00, or 7.00 and 10.01 buffers, whichever will bracket the expected sample range.

2. Press the **POWER** key to turn the pH meter on. All the features of the display will light up. Then the model number, "230", will be displayed. Once all power up procedures are complete the pH meter advances to "MEASURE" mode.

   *For the first time operation, **or if any problems are encountered**, complete the Check Out procedure on page 15 of the pH meter Instruction Manual before using the pH meter.*

   *To conserve battery life, the pH meter has an Auto shutoff feature. If the meter is left on and no key is pressed for ten (10) minutes, the meter will automatically shut off if the Auto shutoff feature is on. Power can be restored by pressing the **POWER** key once. The pH meter needs to be calibrated each time you power up the pH meter.*

3. Press **cal.** CALIBRATION is displayed above the main readout and **P1** is displayed in the lower field. **P1** indicates that the pH meter is ready for the first buffer. Place probe into 7.01 buffer and gently swirl (if a magnetic stirrer is not available) the probe in the buffer solution. When the probe is stable, the **READY** prompt will be displayed and the temperature-corrected value for the buffer is displayed. Press **yes.** The display will remain frozen for two seconds then **P2** will be displayed in the lower field indicating the pH meter is ready for the second buffer.

4. Rinse the probe and blot dry with a wipe. Place probe into the second buffer solution and gently swirl (if a magnetic stirrer is not available) the probe in the buffer solution. Wait for a stable pH display and press **yes.** After the second buffer value has been entered, the electrode slope will be displayed. **SLP** appears in the lower field while the actual probe slope (in percent) appears in the main field. The slope value must be recorded in the Inspector's field notebook.

   *If an error message is displayed, see pages 48-50 of the pH meter Instruction Manual for a description of the error messages.*

   *If "E-23" is displayed, this indicates that the probe slope is not within the desired range (80% to 100%). Press any key EXCEPT **POWER** to acknowledge this message and*

*recalibrate (use fresh standards).* ***Record the second probe slope value in your field notebook for the day, and any descriptive comments of the problem.***

*If the error persists, refer to the manufacturer's probe Instruction Manual for procedures to clean the probe.* ***Record any problems encountered in the field notebook for the day.***

5. The pH meter automatically advances to the measure mode. **MEASURE** is displayed above the main field. Remove the probe from the second buffer, rinse with de-ionized water and blot dry. The pH meter is now ready for use.

6. Place the probe in the slot on the side of the pH meter and set the pH meter down until you are ready to take a pH reading (remember, you will have to press the POWER key to restore power if ten minutes has elapsed between calibration and sampling; you'll need to recalibrate the pH meter after restoring power).

   *NOTE: When the pH meter is no longer needed during the sampling event, rinse the probe with de-ionized water and blot dry. Gently place the probe back into the probe storage compartment on the side of the pH meter. As the probe does not require a storage solution, the probe is stored dry in the storage compartment.*

## 4.0 pH MEASUREMENTS

NPDES Compliance Monitoring: Samples shall be collected in compliance with the monitoring requirements as specified in each of the individual NPDES permits and shall be collected at a location that provides a representative analysis of the effluent.

a. Gently remove the probe from the probe storage compartment and rinse with de-ionized water. Avoid touching the probe (glass bulb) and blot dry with a wipe.

b. Collect a grab sample. Immerse the probe into the sample container and gently swirl (if a magnetic stirrer is not available) the probe in the sample. The pH meter should be in the "MEASURE" mode.

c. Read the pH and temperature values directly from the pH meter display. Record the sample values into the field notebook.

d. Rinse the probe with de-ionized water and return the probe to the storage compartment on the side of the pH meter.

## 5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

QA/QC includes calibration and duplicate analysis.

1. Calibration: Prior to sampling, the pH meter is calibrated according to the steps listed in Section 3.0, c. above.
2. Duplicate analysis: A duplicate is collected and analyzed as part of each field sampling event.

6. PROBE MAINTENANCE

Weekly

a. Inspect the probe for scratches, cracks, salt crystal build-up, or membrane/junction deposits.
b. Rinse off any salt build-up with distilled water, and remove any membrane/junction deposits as directed in cleaning procedures below.

Decontamination/Cleaning Procedures

a. Refer to the probe Instruction Manual

# C-7

## NPDES Chlorine, Total Residual (TRC)[1] Analysis SOP

Chlorine in aqueous solution is not stable, and the chlorine content of samples or solutions, particularly weak solutions, will decrease rapidly. Exposure to sunlight or other strong light or agitation will accelerate the reduction of chlorine. Therefore, start chlorine determinations immediately after sampling, avoiding excessive light and agitation. Do not store samples to be analyzed for chlorine.

### 1.0 EQUIPMENT

a. HACH Chlorine Pocket Colorimeter Test Kit (Colorimeter)
b. Polypropylene or glass sample beakers
c. Lint free wipes
d. Bottle of de-ionized water
e. Latex gloves

### 2.0 REAGENTS

DPD* Total Chlorine Reagent Powder Pillows for 10-mL sample (Cat No. 21056-69)

(* DPD = N,N-Diethyl-p-phenylenediamine)

### 3.0 CALIBRATION

General Note: The Colorimeter is factory calibrated to save you the time and expense required to construct your own calibration curve. The Colorimeter is ready for use without calibration by the user.

### 4.0 MEASUREMENT[2] [3]

NPDES Compliance Monitoring: Samples shall be collected in compliance with the monitoring requirements as specified in each NPDES permit and shall be collected at a location that provides a representative analysis of the effluent.

a. Before use, ensure that the Colorimeter is in the expected range you wish to measure chlorine. To determine which range the instrument is in, press the **ZERO** or **READ** key and look at the display. The low range mode display will show 0.00 mg/L (hundredths) resolution. The high range mode display will show 0.0 mg/L (tenths) resolution. The low range mode is used to calibrate the 0 to 2.00 mg/L Total Chlorine Residual (TRC) tests. The high range mode is for 0 to 4.5 mg/L TRC. **To change modes, press both the ZERO and READ keys**

---

[1] Adapted from- HACH Company. 1991-1998 Chlorine Pocket Colorimeter: Instruction Manual. HACH Company, Loveland, CO, USA. 64pp.
[2] DPD Method adapted from *Standard Methods for the Examination of Water and Wastewater*.
[3] Procedure is equivalent to USEPA Method 330.5 for wastewater and Standard Method 4500-CL G for drinking water.

**simultaneously. After one second, release the ZERO key and hold the READ key until "HI" or "LO" appears in the display. These letters designate the calibration range the instrument will use to determine chlorine in samples. Repeat until the instrument displays the desired mode. Release the key when the instrument is in the correct mode.**

b. A DI water blank must be performed daily to ensure that the colorimeter is functioning properly. Fill a sample cell to the 10-mL line with the DI water. Add the contents of one DPD Total Chlorine Powder Pillow to the sample cell (the prepared sample). Cap the cell and wipe any moisture, dust and/or fingerprints with a lint free wipe from the sample cell. Gently shake for 20 seconds (note: gentle shaking dissipates bubbles which may form in samples containing dissolved gases). Wait 3 minutes. During this period, proceed with steps c-g.

c. Fill a second 10-mL sample cell to the 10-mL line with DI water (the blank). Cap the blank sample cell. Wipe any moisture, dust and/or fingerprints from the sample cell.

d. Grab the blank sample cell by the cap and place in the cell holder, with the 'diamond' mark on the cell facing you. Cover the sample cell with the instrument cap (flat ribbed side should face the back of the instrument).

e. Press **ZERO**. The instrument will display --- followed by 0.00. Remove the blank sample from the cell holder after zeroing, empty the blank sample cell and rinse with de-ionized water.

f. Within 3 minutes after the 3-minute period, place the 'prepared' sample in the cell holder and cover the sample cell with the instrument cap. Note: The instrument automatically shuts off after one minute and stores the last *zero in memory*.

g. Press **READ**. The instrument will display --- followed by the result in mg/L total residual chlorine of the DI water (typical range is 0.00 – 0.01 mg/l). Record the result in your field notebook. Remove the sample cell, empty the sample cell and rinse with de-ionized water

***Measuring Hints***

If the sample temporarily turns yellow after reagent addition, or the display shows over range (flashing 2.20 in display), dilute a fresh sample and repeat the test. A slight loss of chlorine may occur because of the dilution. Multiply the result by the appropriate dilution factor.

h. Rinse the sampling container (polypropylene type) once with de-ionized water. Then rinse the sampling container twice with the sample medium. Grab enough sample to perform the test. Fill a 10-mL sample cell to the 10-mL line with the sample. Add the contents of one DPD Total Chlorine Powder Pillow (note: a pink color will form if chlorine is present and accuracy is not affected by undissolved powder) to the sample cell (the prepared sample). Cap the cell and wipe any moisture, dust and/or fingerprints with a lint free wipe from the sample cell. Gently shake for 20 seconds (note: gentle shaking dissipates bubbles which may form in samples containing dissolved gases). Wait 3 minutes. During this period, proceed with

steps i-n.

i. Fill a second 10-mL sample cell to the 10-mL line with sample (the blank). Cap the blank sample cell. Wipe any moisture, dust and/or fingerprints from the sample cell.

j. Remove the instrument cap. Note: For best results, zero the instrument and read all samples under the same lighting conditions.

k. Grab the blank sample cell by the cap and place in the cell holder, with the 'diamond' mark on the cell facing you. Cover the sample cell with the instrument cap (flat ribbed side should face the back of the instrument).

l. Press **ZERO**. The instrument will display --- followed by 0.00. Remove the blank sample from the cell holder after zeroing, empty the blank sample cell and rinse with de-ionized water.

m. Within 3 minutes after the 3-minute period, place the 'prepared' sample in the cell holder and cover the sample cell with the instrument cap. Note: The instrument automatically shuts off after one minute and stores the last *zero in memory*.

n. Press **READ**. The instrument will display --- followed by the result in mg/L total residual chlorine. Record the result in your field notebook. Remove the sample cell, empty the sample cell and rinse with de-ionized water.

o. The colorimeter will automatically turn off after one minute to conserve battery power.

## 5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

For quality assurance purposes, a duplicate is collected and analyzed as part of each field sampling event.

## 6.0 MAINTENANCE

a. Decontamination/Cleaning

*NOTE: The Colorimeter is inspected and/or cleaned prior to the commencement of sampling. Inspections are also conducted on a daily basis prior to use throughout the sampling season. Refer to manufacturer's manual for decontamination/cleaning procedures.*

1. Wipe all sample cells with a lint-free cloth to remove any water, dust and/or fingerprints.

2. Rinse sample cells three times with de-ionized water.

# C-8

# NPDES Turbidity[1] Analysis SOP

## 1.0 EQUIPMENT

a. LaMotte Model 2020 Turbidimeter (Turbidimeter)
b. Polypropylene sampling container
c. Lint free wipes
d. Bottle of de-ionized water
e. Latex gloves

## 2.0 REAGENTS

Standards of 0.00 and 20.00 NTUs are available but not needed for calibration.

## 3.0 CALIBRATION IS OPTIONAL

***General Note: The Turbidimeter has been pre-calibrated by the factory in the range of 0 to 100 NTU with AMCO™ primary standards manufactured by Advanced Polymer Systems, Inc. This allows the meter to be used for treated water, natural water or wastewater. Recalibration of the Turbidimeter by the user is not required.***

Calibrating the Turbidimeter:

a. From the Turbidimeter case, remove the standard tube marked "20.0 NTU" and carefully wipe off any water, dust and/or fingerprints.

   Any residue on the tubes will interfere with a turbidity reading. Avoid scratching the tubes, scratches can cause inaccurate readings.

b. Open the lid of the Turbidimeter and align the etched indexing arrow mark on the "20.0 NTU" tube with the indexing arrow mark on the Turbidimeter (under the lid), and insert the tube into the chamber.

c. Close the lid and push the **READ** button. If the displayed value is not the same as the value of the 20.0 standard (within ± 0.01 NTU), continue with the calibration procedure.

d. Push the **CAL** button for 5 seconds until **CAL** is displayed. Release button. The display will flash.

[1] Adapted from: Lamotte Company. 2000. 2020 Turbidimeter: Instruction Manual. Lamotte Company, Chestertown, MD, USA. 26pp.

Adjust the display with the up and down arrow buttons until the value of the standard is displayed.

e. Push the **CAL** button again to memorize the calibration. The Turbidimeter display will stop flashing. The calibration is complete.

## 4.0 SAMPLING/MEASUREMENT

The Turbidimeter has two operating modes: the standard operating mode and the EPA mode. The Turbidimeter can only be switched from one mode to the other while turning the Turbidimeter on, from the OFF state. The Turbidimeter will remain in which ever mode last used, even if the Turbidimeter has been turned OFF. To switch from one mode to the other, turn OFF the Turbidimeter, press and hold down the CAL button while pressing the READ button to turn the Turbidimeter on. The Turbidimeter will come on in the opposite mode than last used (while in EPA mode, a triangle will be visible on the display).

The standard operating mode displays the measured turbidity to the full resolution of the Turbidimeter. The EPA[2] mode displays the measured turbidity rounded to the reporting requirements of the EPA and Standard Methods compliance monitoring programs. The difference between the two modes is that the EPA mode eliminates the need for the user to manually round off the results. Turbidity can be measured in either modes.

a. Sampling

Samples shall be collected to determine compliance with the NH Code of Administrative Rules, Chapter Env-Ws 1700, Surface Water Quality Standards. Samples shall be collected at a location upstream and downstream of the point of discharge to the receiving stream. The sample measurements (between the upstream and downstream) for Class B waters shall not exceed the naturally occurring conditions by more than 10 NTUs. Here are a few helpful tips:

1. Always collect downstream samples first to avoid artificially elevating the turbidity in the stream. In addition, always collect the sample on upstream side where you are standing. The sample shall be collected at least ten feet downstream from the discharge point.

2. Upstream samples shall be collected far enough away from the discharge point (e.g. either an outfall pipe or a non-point source) so that the sample collected does not contain any of the wastewater from that point of discharge.

3. Point source discharge samples shall be collected directly from the discharge pipe.

4. Samples should be collected in a clean glass or polyethylene container.

5. Turbidity readings will be affected by electric fields around motors.

[2] Procedure is equivalent to USEPA Method 180.1 for NPDES monitoring programs

6. The Turbidimeter should be placed on a vibration free surface. Vibrations may cause elevated readings.

b. Measurements

1. Fill a clean sampling container with at least 50 mL of sample water and cover. Set sample aside to allow sample to equilibrate to air temperature. Avoid contaminants and analyze as soon as possible.

2. Rinse an empty turbidity tube with a portion of the sample. Shake out excess water.

3. Fill the turbidity tube to the neck by carefully pouring the sample down the side of the container to avoid creating bubbles.

4. Cap the tube and wipe dry with a clean lint-free wipe.

5. Open the Turbidimeter lid, align the etched indexing arrow on the sample tube with the indexing arrow on the Turbidimeter (under the lid) and insert the tube into the chamber.

6. Close the lid. Push the **READ** button. The turbidity in NTU units will be displayed within 5 seconds.

7. Record the displayed turbidity reading in the field notebook, and turn the Turbidimeter off by holding the **READ** button down until the screen reads "OFF". Remove the sample tube, empty the tube and rinse with de-ionized water.

## 5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

For quality assurance purposes, a duplicate is collected and analyzed as part of each field sampling event.

## 6.0 MAINTENANCE

a. Decontamination/Cleaning

*NOTE: The turbidity meter is inspected and/or cleaned prior to the commencement and at the conclusion of the sampling event. Inspections are also conducted on a daily basis prior to use throughout the sampling season. Refer to manufacturer's manual for decontamination/cleaning procedures.*

1. Rinse sample vial three times with de-ionized water.

2. Wipe all vials with a lint-free cloth to remove any water, dust and/or fingerprints.

# C-9

# NPDES Bacteria Sampling SOP

## 1.0 EQUIPMENT

a. 125 ml sterilized plastic sample container
b. Latex gloves

## 2.0 REAGENTS

Sodium thiosulfate if the sample is chlorinated

## 3.0 SAMPLE PROCEDURES

For NPDES Compliance Monitoring, all samples shall be collected in compliance with the monitoring requirements as specified in each of the individual NPDES permits and shall be collected at a location that provides a representative effluent analysis.

a. Sampling Procedures

1. All samples are collected in 125 mL sterilize containers.

2. **If the facility is chlorinating**, collect a sample of chlorinated effluent from the outfall in a sterilized wide mouth plastic jar containing 200 ug/l of 10% sodium thiosulfate solution or tablet.

   **If the facility is dechlorinating**, collect a sample of dechlorinated effluent in a sterilized wide mouth plastic jar containing 200 ug/l of 10% sodium thiosulfate solution. The sodium thiosulfate is used to remove any potential traces of chlorine which will interfere with the analysis.

   **If the facility is not chlorinating (UV disinfection)**, collect a sample of final effluent from the outfall in a sterilized wide mouth plastic jar without sodium thiosulfate solution.

## 4.0 COLLECTION PROCEDURES

a. When the sample is collected, leave ample air space in the bottle to facilitate mixing by shaking, before examination.

b. Collect samples by flushing sample ports and using aseptic techniques (e.g., avoid touching the insides of the container and cap, do not allow the container to come in contact with the sampling port) to avoid sample contamination.

c. Keep sample container closed until ready to fill.

d. Fill, but do not overfill, container without rinsing and replace cap immediately.

## 5.0 COLLECTION TECHNIQUES

a. Collection Technique #1 for submerged outfall pipes and unaccessible launder boxes: Clamp a sample container to an extendable pole. Avoid touching the inside of bottle and cap. Slowly lower the sample container into the outfall pool and fill; BUT DO NOT OVERFILL to avoid diluting the sodium thiosulfate solution.

b. Collection technique #2: If you do not have the equipment as in Collection Technique #1, you can grab a sample by means of an automatic sampler which may be located at the facility's effluent station. Remember to flush the line before collecting a sample.

## 6.0 PRESERVATION

Preserve all samples on ice in a cooler and submit the samples to the NHDES Laboratory Services Unit within six hours from the time of sample collection.

## 7.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

QA/QC is inherent to NHDES Laboratory Services Unit's procedures for bacteria tests. Additional QA practices can be found in EPA's manual of microbiological methods[1] which provides added guidance on sampling and analytical methodology.

[1] EPA 600/8-78-017, Environmental Monitoring & Support Lab.

# C-10

# NPDES ISCO Sampler Cleaning SOP

## 1.0 STANDARD WASH (NON-METALS SAMPLING)

### a. Required Equipment

1. 'Liquinox' (brand name; phosphate-free detergent or equivalent)
2. Flat head screwdriver or pliers for removing hose clamps
3. Bottle brush/scrub brush
4. A wash sink w/hot water and if available, sink hose sprayer
5. De-ionized water
6. Latex gloves

### b. Procedure for cleaning sample bottles

1. Plug sink drain and add 5-10 ml of Liquinox (or its equivalent) detergent.
2. Fill sink ½ full w/hot water.
3. Remove sample bottles from the bottle kit holder
4. Submerge bottles in hot soapy water and scrub with bottle brush to remove solids and/or film.
5. Triple rinse bottles with tap water then triple rinse bottles with de-ionized water.
6. Place bottles in storage base, upside down, to drain and dry.

### c. Procedure for cleaning suction line, pump and discharge tubings

1. Clean the suction line, pump and discharge tubings by placing the end of the suction line in the hot soapy water and pumping the soapy water through the delivery system by manually operating the pump. If these items are severely contaminated (e.g., discoloration, solids build-up, oily sheen, etc.), discard them to trash.
2. Rinse with clean tap water for two minutes.
3. Rinse with de-ionized water for one minute.

### d. Procedure for cleaning the strainer

1. Clean the strainer with a brush and hot soapy water.
2. Rinse with tap water for two minutes followed by a one minute de-ionized water rinse.

### e. Procedure for cleaning controller, top cover, center section, retaining ring and tub

1. Clean the top cover, center section, retaining ring, and tub with warm soapy water or by spraying them with a hose. Avoid using a high-pressure hose to clean the controller, especially around the control panel. Extreme pressures may force water past the control-panel seal

NOTE: When cleaning the controller and top cover, cap the connectors at the back of the controller tightly. Keep a battery connected to the power-source connector, or replace the protective cap (shipped with sampler) over the power source connector, to protect the pins from moisture damage. Make sure the pump drain hole (located at the bottom right-hand side of the pump, beneath the pump band) is open and free of debris or buildup.

2. After complete drying, reassemble the ISCO sampler and place in a safe/dry storage area.

## 2.0 MAINTENANCE CHECKLIST

1. Inspect the pump tubing for wear. Replace if necessary.
2. Clean the pump tubing housing.
3. If the suction line appears contaminated, change the suction line.
4. Check the humidity indicator. If the indicator reaches the area marked “30” on the paper humidity indicator (which turns pink), the dessicant inside the controller box should be recharged. See ISCO manual for details.
5. When the battery warning appears on the display, replace the controller’s internal battery. See ISCO manual for details.

## 3.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The cleaning procedure is inherent to QA/QC protocol. The detergent must be free of nutrients (including phosphates) and other contaminants.

# C-11

## NPDES Dissolved Oxygen/Temperature Sampling SOP

1.0 EQUIPMENT

a. YSI Model 55 Handheld Dissolved Oxygen and Temperature Meter
b. Latex gloves

2.0 CALIBRATION:

***General Note: The dissolved oxygen calibration must be done in an environment with a known oxygen content. Since a relative humidity of 100% makes an excellent environment for calibration, the moist sponge in the calibration/storage chamber creates a 100% water saturated air environment for proper calibration. Ensure that the DO sensor does no contact the wet sponge by inserting the sensor only until the rubber o-ring seal is flush with the outer edge of the chamber.***

Before you calibrate the Dissolved Oxygen Meter:

To accurately calibrate the YSI Model 55, you will need to know the following information:

1. The approximate altitude of the region in which you are located.
2. The approximate salinity of the water you will be analyzing. Fresh water and as well as sanitary wastewater has a salinity of approximately zero. Sea water has a salinity of approximately 35,000 mg/L or 35 parts per thousand (ppt).

Calibration Process:

1. Remove the oxygen probe from the calibration chamber and check to ensure that the sponge inside the instrument's calibration chamber is wet. Re-insert the probe back into the chamber but do not allow the tip to come in contact with the wet sponge..

2. Turn the instrument on by pressing the **ON/OFF** button on the front of the instrument. Wait for the dissolved oxygen and temperature readings to stabilize (usually 15 minutes is required after turning the instrument on).

3. To enter the calibration menu, use two fingers to press and release both the **UP ARROW** and **DOWN ARROW** keys at the same time.

4. The LCD will prompt you to enter the local altitude in hundreds of feet. Use the arrow keys to increase or decrease the altitude. Example: Entering the number 12 indicates 1200 feet. When the proper altitude appears on the LCD, press the **ENTER** key.

   The LCD should now display **CAL** in the lower left of the display, the calibration value (98%) is

displayed in the lower right and the current DO reading (before calibration) shown on the main display.

5. Make sure that the DO % saturation reading (large display) is stable (should be in the range of 98 $\pm$ 0.1%), then press the **ENTER** button. The LCD will prompt you to enter the approximate salinity of the water you are about to analyze. You can now enter any number from 0 to 40 ppt of salinity. Use the arrow keys to increase or decrease the salinity setting. When the correct salinity appears on the LCD, press the **ENTER** key. The instrument will return to normal operation.

6. If the calibration value is not within 98 $\pm$ 0.1%, then recalibrate according to Steps 3 through 5. If calibration is successful, continue with Steps 7 through 10.

*NOTE: The calibration procedure outlined as Step 7 through 10 is only administered as a check to determine if the dissolved oxygen probe is working correctly at the low range of the instrument. If the probe is not functioning properly, the main display will read "Er 5" which means to either re-calibrate using correct altitude and salinity or return the instrument for service.*

7. Place the sensor in a zero oxygen environment (excess sodium sulfite and cobalt chloride solution) and allow 5 minutes for the meter to equilibrate.

8. After the dissolved oxygen rate stabilizes, record the reading on Attachment A – Sample Data Summary Sheet. The zero DO standard reading should be < 0.5 mg/L. If zeroing is successful proceed to next step. If not, stop, the instrument needs to be serviced by YSI.

9. Rinse the sensor thoroughly to completely remove any chemical residuals.

10. Proceed to the measurement procedures outlined in section 3.0 below.

Once the calibration process is complete, the only keys which will remain operational are the **MODE,** the **LIGHT** and the **ON/OFF** keys.

**For best results:**

Each time the meter is turned off, re-calibrate before taking measurements.

## 3.0 MEASUREMENT

1. Measurements shall be taken at a location downstream from all processes (outfall pipe or after the chlorination/de-chlorination system).

2. Gently lower the probe into the wastestream where there is ample turbulence but avoid the probe from being slapped against any objects. It is important to recognize that oxygen dissolved in the wastestream is consumed during the test. It is therefore essential that the wastestream be moving at the sensor tip. If stagnation occurs, the readings will be artificially

low. If there is little to no turbulence, move the probe in an up and downward motion in the wastestream.

3. After the dissolved oxygen rate stabilizes, record the reading on Attachment A – Sample Data Summary Sheet.

4. Record the temperature[13] of the wastestream on Attachment A - Sample Data Summary Sheet.

5. Rinse the probe well with distilled water prior to placing the probe back into the calibration/storage chamber.

## 4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

For quality assurance purposes, calibrate at a temperature within $\pm$ 10 $^{o}$C of the sample temperature.

## 5.0 MAINTENANCE

a. Inspection

*NOTE: The Dissolved Oxygen meter is inspected prior to the commencement and at the conclusion of the sampling event. Inspections are also conducted on a daily basis prior to use throughout the sampling season.*

1. If you look into the calibration/storage chamber, you should notice a small round sponge in the bottom. Carefully put 3 to 6 drops of distilled water onto the sponge. Turn the instrument over to its side and allow any excess water to drain out of the chamber. This creates a 100% water saturated air environment for the probe which is ideal for dissolved oxygen calibration.

2. Membrane life depends on usage. Membranes will last a long time if installed properly and treated with care. Check for loose, wrinkled, damaged or fouled membranes and any large (more than 1/8" diameter) bubbles in the electrolyte reservoir. Replace the membrane and the KCL solution as per the manufacturer's instructions.

3. The gold cathode must always be bright for correct probe operation. If it is tarnished, use YSI Model 5680 Probe Reconditioning Kit and follow the cleaning instructions in the owner's manual.

4. The silver anode must be tarnish free for successful calibration. If it is tarnished, soak the probe overnight in 3% ammonium hydroxide and follow the cleaning instructions in the owner's manual.

[13] The internal temperature sensor is annually certified using a NIST certified thermometer.

b. Decontamination/Cleaning

*NOTE: Before the meter can be serviced, equipment exposed to biological or toxic materials must be cleaned and disinfected. Biological contamination is presumed for any instrument, probe, or other device that has been used with wastewater.*

1. Decontaminate all exposed surfaces with either 70% isopropyl alcohol or a solution of ¼ cup bleach to 1 gallon of tap water. The probe may be disinfected with 0.5% Lysol if this is more convenient to the user.

# Appendix D

# Track 2000 Data Entry Screens

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For Insertion Of
Track 2000 Data Entry Screens

# Appendix F

## Example of a Sampling and Analysis Plan

**Example of a**
**Sampling and Analysis Plan**

Since this is a non-generic QAPP, SAPs would not typically be developed. However, if there's ever a need to prepare a SAP as a result of any deviations and/or stipulations, this SAP example would be used.

Sampling and Analysis Plans (SAPs) will be prepared by the Program QA Officer, reviewed and approved by the Program Manager prior to field work, and a copy retained in the WWEB P&C files (referenced from Section A-9 of the QAPP). A copy of the approved plan will be sent to the NHDES Quality Assurance Manager. The Program QA Officer is responsible for communicating the SAP and other QA/QC requirements to other field sampling Inspectors that may be working in the program.

The SAPs will reference its parent QAPP. Deviations from and stipulations not addressed in the parent QAPP will be incorporated into the SAPs. These will include site information, rationale, program description and schedule (if applicable), analysis, and reporting. Additional information will be considered and added when applicable. Also, the Program QA Officer will be responsible to locate or produce procedures for any deviations and stipulations, in particular, sampling and testing required for a criteria that is not addressed in the parent QAPP, in which case the Program Manager will review and approve. An example of possible information per deviation and/or stipulation is as follows:

**Site Information**
- Site location
- Sample location
- Personnel identification and organization

**Rationale**
- Problem definition
- Historic Data (if applicable)
- Matrix of concern

**Program description and schedule**
- Sampling design (sampling location, sampling and analysis method/SOP requirements)
- Sampling procedures and requirements
- Data analysis

**Reporting**
- To whom results and discussion are reported